Library

SECOND SERIES VOL. VI, No. 12

BULLETIN

OF

THE NEW YORK

ACADEMY OF MEDICINE

DECEMBER, 1930

INCORPORATED 1851

PUBLISHED MONTHLY BY
THE NEW YORK ACADEMY OF MEDICINE
Fifth Avenue and 103rd Street
NEW YORK, N. Y.

SECOND SERIES VOL. VI, No. 12

BULLETIN

OF

THE NEW YORK ACADEMY OF MEDICINE

DECEMBER, 1930

INCORPORATED 1851

PUBLISHED MONTHLY BY
THE NEW YORK ACADEMY OF MEDICINE
Fifth Avenue and 103rd Street
NEW YORK, N. Y.

Entered as second-class matter, February 3, 1928, at the Post Office at New York, N. Y., under the Act of August 24, 1912.

Subscription $2.00 per year. Single copies, 25 cents.

CONTENTS

ANNUAL GRADUATE FORTNIGHT. MEDICAL AND SURGICAL ASPECTS OF ACUTE BACTERIAL INFECTIONS, October 20 to 31, 1930 759

Focal Infection as the Cause of General Disease, Frank Billings 759

Medical Education and Medical Practice, C. F. Martin 774

Acute Hematogenous Osteomyelitis, Fenwick Beekman 792

Acute Infections of the Urinary Tract, Joseph F. McCarthy 808

Book Reviews:

The Conway Letters, F. H. Garrison 825

A New Bilingual of Fracastorius, F. H. Garrison 828

Recent Accessions to the Library 833

Proceedings of Academy Meetings 836

Fellows Elected December 18, 1930 843

Deaths of Fellows of the Academy 843

OFFICERS AND STAFF OF THE ACADEMY

1930

President
JOHN A. HARTWELL

Vice-Presidents
JOHN E. JENNINGS
EDWIN BEER
LEWIS A. CONNER

Recording Secretary
FENWICK BEEKMAN

Treasurer
SETH M. MILLIKEN

Trustees

EUGENE H. POOL
BERNARD SACHS
CHARLES L. DANA
SAMUEL A. BROWN
ARTHUR B. DUEL
WALTER L. NILES
SAMUEL W. LAMBERT
JAMES ALEX. MILLER
JAMES F. MCKERNON
GEORGE D. STEWART

Council
The President

The Vice-Presidents
The Trustees
The Treasurer
The Recording Secretary
The Chairman of
Standing Committees

Director
LINSLY R. WILLIAMS

Librarian
ARCHIBALD MALLOCH

Medical Secretary
Committee on Medical Education
FREDERICK P. REYNOLDS

Executive Secretary
Public Health Relations Committee
E. H. L. CORWIN

Assistant Treasurer
RODERICK V. GRACE

Legal Counsel
FRANK L. POLK, ESQ.

Library Consultants

JOHN S. BROWNNE
LAURA E. SMITH
FIELDING H. GARRISON
ARNOLD C. KLEBS
B. W. WEINBERGER
LEONARD L. MACKALL

BULLETIN OF
THE NEW YORK
ACADEMY OF MEDICINE

VOL. VI DECEMBER, 1930 No. 12

ANNUAL GRADUATE FORTNIGHT

FOCAL INFECTION AS THE CAUSE OF GENERAL DISEASE*

FRANK BILLINGS
Professor Emeritus of Medicine,
University of Chicago

Focal infection as an etiologic factor of general diseases is now an established pathological principle.

During the last twenty years an enormous literature on the subject has accumulated. As this literature is available, this address will deal chiefly with the important principles of focal infection.

A few general diseases only, caused by focal infection will be cited; but sufficient in number to illustrate the principles discussed.

Focal infection may be either primary or secondary. A primary focus is a circumscribed area of infected tissue communicating with a mucous, a serous or cutaneous surface. Secondary foci of infection are usually the direct results of infection from primary foci through contiguous tissue or of distant tissues through the blood stream or lymph channels.

SITE OF PRIMARY AND SECONDARY FOCI OF INFECTION

The most common site of a primary focus of infection is about the head including the teeth and jaws, the faucial tonsils, the lymphoid tissue of the nasopharynx, the acces-

*Delivered October 20, 1930.

sory nasal sinuses, the mucosa of the upper nasal cavities, the middle ear and mastoid cells. Less frequently primary foci are located in the skin including pyogenic infection of finger and toenails; in the bronchi as bronchiectatic cavities; ulcers acute or chronic in the intestinal tract and rectum including infected hemorrhoids; in the genitourinary tract, fallopian tubes, venous sinuses of the uterus, seminal vesicles, the deep urethra and prostate.

Secondary foci of infection occur in the lymph vessels and nodes, especially of the neck and mediastinum and mesentery. In the gallbladder and appendix vermiformis as chronic infection. In distal tissues anywhere in the body in the form of metastases.

Modes of Transmission of Bacteria and Toxins from the Foci of Infection

The usual mode of transmission of the infectious agents or their toxins from the primary focus of infection is hematogenous. In diphtheria the toxin excreted by the diphtheria bacilli circulates in the blood and causes reactions manifested in that disease. From the focus of infection caused by the endotoxic bacteria, the infectious agents as bacterial emboli may be carried in the blood stream to distant tissues and lodge in the small blood vessels. It is not improbable that autolysis of endotoxic bacteria may occur in a primary focus and the toxin set free circulate in the blood stream.

Lymphogenous transmission: Lymph nodes proximal to primary foci may become secondary foci of infection and persist after the removal of the primary focus. The infectious agents may cause local disturbance in the lymph nodes or surrounding tissues, may filter onward through the connecting lymph channels and nodes causing additional secondary foci; may finally reach the blood stream and reinforce the infectious agents primarily transmitted through the blood stream. The infectious agents in the lymph nodes may be held there as a latent infection for an indefinite period and finally through some cause become

pathologically active and cause manifest clinical, local or general disease; this is especially true of tuberculosis.

The Behaviour of the Pathogenic Microörganism in the Metastases

The behaviour of the infectious agents carried through the blood stream to distant tissues as bacterial emboli is dependent on the virulence of the microörganisms. If virulent, the reaction of the tissues is characterized by severe local disturbance, the accumulation of leucocytes and lymph cells through chemostasis resulting in a circumscribed abscess or necrosis or gangrene.

If the infectious agents are mildly virulent, the reaction in the tissues is characterized by proliferation of the endothelium of the blood vessel partly or wholly obstructing the local blood flow, slight hemorrhage into the tissues and a serous or serofibrinous exudate in the local tissues.

These tissue reactions to virulent pathogenic microörganisms and also to the less virulent forms of bacteria can be observed in patients and also in experimental animals intravenously injected with the respective pathogenic microörganisms. In the patient the classic example of virulent infection is seen in abscess or necrosis or gangrene in appendicitis; and of the effect of less virulent infectious agents in glomerular nephritis characterized by varying degrees of hematuria, albuminuria and cylindruria which often disappear rapidly with a prompt removal of the causative focus of infection.

Tropism

At this point in the discussion of the subject it is necessary to discuss the possible quality of tropism of the infectious microörganisms causing focal infection.

Tropism is found to a considerable degree in the typhoid bacillus. Apparently the disease begins as a bacteriemia and the lymphoid tissue, the solitary glands and Peyer's patches of the ileum and colon are the chief tissues at-

tacked in the course of the disease. Early in the disease the typhoid bacillus as emboli cause petechiæ of the skin; through the blood stream reach the gallbladder, usually become latent within the organ creating typhoid carriers and perhaps at some time cholecystitis with or without gallstones.

The pneumococcus of all types possesses a true tropism for lung tissue.

A strain of the Treponema pallidum possesses a tropism for the tissues of the brain, spinal cord and meninges. The meningococcus has a tropism for the meninges of the brain and cord. The ultramicroscopic filterable virus of infantile paralysis possesses a tropism for the gray motor tracts of the spinal cord and brain and little or none for the gray matter of the sensory tracts.

Animal experimentation by clinical bacteriologists seems to fortify the quality of tropism in strains of streptococci and also that tropism may be acquired by streptococci through special methods of culture in the laboratory. In 1902, G. Forssner (3) produced a specific tropism for the kidney in a strain of ordinary Streptococcus hemolyticus by culture in kidney and kidney extract. When this strain of streptococcus was injected intravenously into animals it produced constantly outspoken lesions of the kidney. This tropism was lost when the specific kidney strains were again cultivated in ordinary bouillon. E. C. Rosenow (2) has for many years maintained that specific tropism can be induced in streptococci and other pathogenic bacteria by repeated intravenous injections of any respective pathogenic bacteria and varying technic in methods of culture.

While the quality of tropism in infectious agents is an important principle, it has been and continues to be a controversial question. Even with those adherents of tropism as an important factor in focal infection relating to general disease, it must be conceded that bacteriemia of some degree due to a focus of infection, must cause more or less injury to all the tissues and organs in general disease even

though the quality of tropism may injure some tissue or organs more than others.

The fact is that in the hematogenous invasion of the body by pathogenic bacteria, even with infectious agents of mild virulence, widely extended injury of varying degrees occurs even though the chief clinical expression may be restricted to one organ or to the tissues and joints in acute or chronic arthritis. It must also be borne in mind as a principle that the injury inflicted to the small blood vessels by the infectious agent in the blood stream has an important influence on the immediate and future course of the general disease.

Character of the Infectious Microorganisms of Foci of Infection

The dominant infectious agents causing foci of infection are the streptococci; S. hemolyticus, S. viridans; staphylococci; S. albus, S. aureus; the tubercle bacillus; the gonococcus; the diphtheria bacillus; the colon bacillus when removed from its normal habitat and in mixed infection with other pathogenic bacteria.

The incidence of primary foci of infection, especially of the mouth, tonsils and upper air passages is very great. In addition to the presence of innumerable saprophytes, the mouth and pharynx contain various strains of streptococci, staphylococci, pneumococci, diphtheria bacilli and other bacteria in a latent state which may become pathogenic.

Foci involving the teeth and gums usually include pyorrhea, pulp infection and apical root involvement. In these lesions are found strains of streptococci, staphylococci, fusiform bacilli and other less important bacteria.

Acute and chronic tonsillitis may occur at any age, but more frequently in children because of the presence of an excess of lymphoid tissue in the pharynx. The tonsils are exposed to infection through contaminated air, infected food especially milk and by direct contact with other infected individuals. The faucial tonsils may, when small, look inno-

cent because of the smoothness of the overlying mucous membrane which may obstruct infected crypts. So too, the stumps of tonsils, the remains of tonsillotomy, may contain infected crypts sealed in by the operative scar. The infected tonsils and other lymphoid tissue of the throat may yield cultures of streptococci, Micrococcus catarrhalis, pneumococci, diphtheria bacilli and sometimes tubercle bacilli. Infection of the accessory nasal sinus is a very frequent occurrence in the changeable seasons of the year. The most frequent bacterial causes of sinuitis, both acute and chronic, are strains of streptococci, pneumococci and sometimes staphylococci.

Chronic bronchitis when associated with emphysema, asthma and bronchiectatic cavities becomes a focus of infection which may cause general disease and also trophometabolic changes in bones and joints. In the conditions named the sputa usually yield cultures of many saprophytic bacteria and other microörganisms as well as streptococci, staphylococci and fusiform anærobes.

The intestinal tract and its appendages may be the site of primary and secondary foci of infection. Here the cause may lie in acute or chronic ulcers associated with stasis of the intestinal contents, in ulcers of the rectum and in infected thrombotic hemorrhoids. In addition to the colon bacilli, streptococci and other pathogenic bacteria may gain entrance to the intestinal canal by swallowing infectious material from the mouth or nose and through infected food especially milk. These pathogenic agents may cause infection of the lymph nodes of the mesentery and remain as secondary foci.

The appendix vermiformis is susceptible to infection, both acute and chronic, by streptococci and other infectious agents through the blood stream. In the acute type, surgical removal is usually prompt. In the chronic and recurrent type, it becomes a focus of infection especially in relation to the proximal mesenteric glands and lymph vessels which may lead to infection of the liver and subdiaphragmatic tissues.

The gallbladder is subject to infection through the blood stream by the typhoid bacillus and by strains of streptococci. The colon bacillus is sometimes present as a mixed infection. Chronic cholecystitis often undetected, is a not infrequent focus of infection causing general disease.

Immediately after miscarriage or abortion or infection at childbirth, pathogenic bacteria usually Streptococcus hemolyticus, may reach the venous sinuses of the uterus, cause infected thrombi with resulting bacteriemia with serious systemic results.

The fallopian tubes are susceptible to infection with the gonococcus which may cause obliterating salpingitis or abscess and may cause peritonitis. Tuberculous salpingitis may lead to peritonitis or to tuberculous invasion elsewhere. The deep urethral tract, prostate gland and especially the seminal vesicles are frequently infected with the gonococcus and sometimes as a mixed infection with streptococci. Gonococcus infection of the seminal vesicles may be acute or chronic and as a primary focus of infection may lead to arthritis acute or chronic, gonorrheal bacteriemia and ulcerative endocarditis.

The skin and its appendages may be the site of foci of infection in the form of furuncles, abscesses about the finger and toenails, blisters and abrasions infected with the ever present staphylococcus on the skin and sometimes by streptococci.

Susceptibility to Focal Infection

Susceptibility to focal infection involves the question of natural and acquired immunity to disease. Natural and acquired immunity is never absolute. It may be diminished partly or wholly by all of the causes of mental and physical debility including poor inheritance, squalor, poverty, poor sanitation domiciliary and community, neglect of personal hygiene, contaminated food and drink, chronic non-infectious general disease, alcoholic and drug addiction and other causes. An unbalanced diet deficient in the specific vitamins may result in anatomical defects of the

jaws and teeth inviting infections, also infantile scurvy, rickets and to other defects in physical growth and development. To these causes of susceptibility to focal infection must be added contact infection of the mouth and upper air passages with streptococci and other pathogenic bacteria and also of the sexual organs with the gonococcus and Treponema pallidum.

Susceptibility to General and Also to Local Disease from the Focus of Infection

The incidence of general and local disease from the focus of infection is notably small in comparison with the incidence of primary and secondary foci of infection. The marked prevalence of infection of the jaws and teeth is not associated with the frequent incidence of acute or general disease. The incidence of chronic gonorrheal infection of the deep urethra, prostate gland and seminal vesicles is very great as compared with the occurrence of gonorrheal arthritis, tenosynovitis, gonococcemia and ulcerative endocarditis.

The relatively rare incidence of systemic disease as compared with the marked prevalence of foci of infection may be explained by well known facts of immunity, both natural and acquired. The natural defenses of the body due to the bactericidal and antitoxic powers of the tissues, blood plasma and cells especially the phagocytes protect us from infectious diseases both acute and chronic. Furthermore, when the animal body is invaded with pathogenic bacteria, the natural defenses are increased by their presence in the tissues and blood. Similar stimulation of the formation of protective antibodies may be induced in the host by the injection of nonlethal amounts of living bacteria or of dead pathogenic agents.

Bacteria may diminish in virulency and pathogenicity and exist as harmless parasites of the skin, mucous membrane and probably also in the existing foci of the tissues.

The immunity to infection from foci of infection to general and local disease may be partly or wholly broken down by the same causes noted in the discussion of the susceptibility to foci of infection. Exhaustion and debility from physical and mental overwork, starvation, chronic noninfectious general disease and exposure to wet and cold are important factors in the increased susceptibility to acute and chronic general disease from focal infection. It is also to be noted that poor body mechanics including faulty posture, defective functions of the respiratory organs, diminished blood pressure with poor circulation, defective general nutrition and other factors increase the susceptibility to systemic infection from a focal infection especially in the so-called chronic rheumatic disorders.

Diagnosis of the Foci of Infection in the Etiologic Relationship to General Disease

In the diagnosis of the focus of infection related to a general disease, the first and very important step is to make a careful history of the patient's past and present complaints; a general examination should be made including if necessary, the aid of qualified medical and surgical specialists. With proper technic infected material may be obtained from the tissues containing the focus of infection which will permit of microscopic examination and the attempt to produce bacterial cultures.

When a systemic disease occurs which present day knowledge associates with a primary infectious focus, the site of the focus must be located. The character of the systemic disease may point to the most likely location of the primary portal of entrance. The primary site of acute rheumatic fever, endocarditis, glomerulo-nephritis, chronic atrophic arthritis, iritis, acute appendicitis and acute cholecystitis is usually located in infection of the jaws and teeth, acute or chronic tonsillitis and sinuitis. The cause of gonorrheal arthritis is usually located in the genitourinary tract.

Examples of Acute General Disease Due to a Focus of Infection

Rheumatic fever is most prevalent in the damp and cold season of the year; its incidence is greatest in the young and in the more exposed male of all ages. For many years clinical observation has noted a relationship of acute rheumatic fever to tonsillitis. An acute attack of tonsillitis may have occurred an indefinite number of days before the onset of the systemic disease. Acute rheumatic fever is undoubtedly caused by a strain of the streptococcus group of bacteria, but it is the consensus of opinion of clinicians and investigators that a specific strain of the streptococcus has not yet been identified. We may hope for the identification of a specific strain of the streptococcus causing acute rheumatic fever of the classical type as has been identified in erysipelas and in scarlet fever.

Acute Glomerulo-Nephritis

Acute glomerulo-nephritis usually develops without subjective symptoms. The objective signs are varying degrees of hematuria, albuminuria and cylindruria with infections about the teeth, jaws, tonsils or sinuses. If the removal of the foci of infection causing the infection is neglected, the kidney lesions may develop into chronic nephrosis.

Acute Appendicitis

Acute appendicitis due to hematogenous infection from a primary focus located in the jaws and teeth, more often in the faucial tonsil, and from other foci of infection in the head, has been noted by clinical observers in Germany, France and the United States. Cannon (4) states that appendicitis and cholecystitis are of hematogenous origin. He emphasizes the opinion that typhoid cholecystitis occurs hematogenously. Adrian (5) cites clinical observation of tonsillitis and throat infections which he describes as angina associated with appendicitis. He calls attention to the similarity in histology of the lymphoid structure of the tonsils and appendix, and gives this ana-

tomical similarity as a reason for the etiological relationship of angina to appendicitis. He coined the term "anginal appendicitis" to express this relationship.

Subacute Infective Endocarditis

Subacute infective endocarditis was first described by H. Schottmüller (6) as endocarditis lenta caused by a green producing microörganism which he called Streptococcus viridans. The disease was described by Sir William Osler (7) and by F. Billings (1) and E. C. Rosenow (2) as chronic infectious endocarditis, by Thomas J. Horder (8) as infective endocarditis and by E. Libman and H. C. Celler (9) as subacute infective endocarditis. This latter name is now generally accepted.

The disease is recognized readily by a usually constant Streptococcus viridans bacteriemia, by petechiæ of the skin and mucous membrane, by fever of an intermittent type of low grade and by the usual local signs of endocarditis.

Occasionally it has been found to be due to a primary focus of infection especially about the roots of the teeth. It is characterized by an enormous growth of vegetations on the heart valves and endocardium entangling blood cells and thrombi. It is a condition of infection which affords an excellent example of the law propounded by William H. Welch in which the infectious microörganisms immunize themselves against the antibodies and other protective agents of the host. The disease is usually fatal.

Examples of Chronic General and Local Disease Due to Primary and Secondary Foci of Infection

Chronic Cholecystitis

Chronic cholecystitis with or without gallstones, is as a rule the result of acute infection of hematogenous origin.

Chronic infectious cholecystitis is of importance because of the discomfort it may cause and its interference with the function of digestion. It is quite as important as a secondary focus of infection causing general disease. This

infection may lead to biliary cholangitis evidenced by the long known entity hepatic intermittent fever; to degenerative changes in the heart muscle and kidneys; to types of perineuritis and other conditions. The surgical eradication of the infection is usually followed rapidly by the disappearance of the intermittent fever, the restoration of the heart muscle tone, a disappearance of the evidence of kidney degeneration and relief from the uncomfortable lameness due to perineuritis.

Chronic Infectious Arthritis

Chronic arthritis is classified as an atrophic form and as an hypertrophic type. Chronic arthritis is widely disseminated, the atrophic type occurring in the young to middle age and the hypertrophic type in those beyond middle age. It is important because of its crippling results and discomforts and also because of the great economic loss which it entails.

After long study, the American Committee for the Control of Rheumatism, its members composed of clinicians and investigators whom we all respect, has issued an opinion concerning the disease commonly known as chronic rheumatism or chronic arthritis. The Committee is of the opinion that hypertrophic arthritis is not of infectious origin, but that atrophic arthritis is an infectious type of the disease. The opinion is given that no one strain of the streptococcus or of other bacteria has been discovered as a specific etiologic factor.

This report of the Committee has been published in an essay by Osgood (10) of Boston. In this paper Osgood gives a clear, comprehensive and satisfactory description of hypertrophic arthritis and also of atrophic arthritis or chronic rheumatism, which I recommend should be read by all members of the profession interested in the subject.

The members of the American Committee for the Control of Rheumatism individually and as a committee, believe apparently that much of the morbid anatomy and resulting dysfunction which occurs in the joints, muscles

and tendons of atrophic arthritis, is due to the diminished blood circulation of the involved tissues. With this opinion I agree and direct attention to statements I have made in former publications and in this paper to the probability that hematogenous infection by bacterial emboli or their toxins is a large factor in the diminution of the blood circulation especially in the smaller blood vessels.

In the treatment of the condition it is interesting to note that at the Mayo Clinic lumbar sympathetectomy has restored a liberal blood circulation to the lower extremities of patients suffering with atrophic arthritis with phenomenal restoration of function of joints and muscles and great favorable changes in the morbid anatomy of the affected parts.

Gonorrheal Arthritis

Gonorrheal arthritis is a classical demonstration of general disease from a focus of infection. It may be acute or chronic. The focus is usually in the seminal vesicles or in the infected thrombi and veins about the base of the bladder. The gonococcus seems to exist as a virulent pyogenic type and also as a strain much less virulent and nonpyogenic. In the pyogenic type of arthritis, joints and tendon sheaths may be involved. Early surgical drainage is necessary. Associated with acute gonorrheal arthritis may be a gonococcemia which may exist also in the absence of arthritis and the further development of a malignant type of endocarditis.

In the chronic type of gonorrheal arthritis the joint exudate is usually serofibrinous, involves the knee joint by preference, may attack other joints including the temporomaxillary and the sternoclavicular. The disease is usually very painful and associated with marked disability. Removal of the focus of infection surgically when necessary, or by massage of the seminal vesicles and other local tissues followed by a proper after care will usually result in cure.

Anaphylaxis

In addition to general disease, a focus of infection may excite the condition known as anaphylaxis or allergy.

It has been suggested that the bacteria proteins or the split products thereof of the infectious microörganisms of the focus of infection may be absorbed parenterally through the blood stream and as a formed protein sensitize the body cells by the formation of specific antibodies within eight or ten days, after which a further absorption of the bacterial protein may excite the well known phenomena of anaphylaxis. Among the clinical phenomena produced by this type of anaphylaxis, a form of bronchial asthma may occur. S. J. Meltzer (11), V. C. Vaughan (12) and other investigators and clinicians have expressed the opinion that some types of bronchial asthma may occur from the parenteral absorption of bacterial proteins and other forms of albumins. I have observed complete relief of this type of bronchial asthma by the eradication of the offending focus of infection.

Prevention and Treatment of Foci of Infection

Prevention of foci of infection is important and should embrace the removal or eradication of the causes which increase the susceptibility to focal infection. The conditions which increase the susceptibility to focal infection have been mentioned and all of them are important and should be corrected if that is possible.

Attention should be given to foci of infection when they are recognized and especially in the jaws, teeth and throats of children, before general disease occurs. But in this work and also in the eradication of foci of infection when the general disease is present, common sense should be the guide.

I regret to say that too often through superficial examination, failure to apply rational principles and poor judgment, teeth and tonsils are needlessly sacrificed, often to the detriment of the patient's health. We all know that

in some instances a crusade of tooth extraction of teeth at all ages and of tonsillectomy in children has been carried on in some communities with the object of promoting the present and future health of children and adults. We are not all in accord with the wisdom of such an undertaking.

The subject of focal infection causing general and local disease needs continued clinical observation and research which will, I believe, correct the mistakes of the past and present in the diagnosis and treatment of the condition, and lead to a more efficient knowledge of the subject which is so important as a fundamental pathological principle.

BIBLIOGRAPHY

1. Billings, Frank. *Focal Infection; The Lane Medical Lectures.* D. Appleton and Co., New York and London, 1917.
2. Rosenow, E. C. The Newer Bacteriology of Various Infections as Determinated by Special Methods. *Jour. A. M. A.* 1914, LXIII, 903.
3. Forssner, G. Renale Lokalisation nach intravenosen Injektiönen mit einer dem Nierengewebe experimental angepassten Streptokkencultur. *Nord. Med. Arkiv.,* 1902, XXXV, 1-56.
4. Cannon, Dr. Ueber die Frage der hâmatogenen Infektion bei Appendicitis und Cholecystitis. *Deutsch. Zeitschr. f. Chir.,* 1908, XCV, 21
5. Adrian, C. Die Appendicitis als Folge einer Allegemeinerkrankung. Klinisches und experimentelles. *Mitteil a. d. Grenzgeb. d. Med. u. Chir.,* 1901, VII, 407.
6. Schottmüller, H. Die Artunterscheidung der für Menschen pathogenen Streptokokken durch Blutagar. *Münch. Med. Wchnschr.,* 1903, L, 849.
7. Osler, Sir William. Chronic Infectious Endocarditis. *Quar. Jour. Med.* 1909, II, 219.
8. Horder, Thomas J. Infective Endocarditis. *Quar. Jour. Med.* 1909, II, 289.
9. Libman, E., and Celler, H. L. The Etiology of Subacute Infective Endocarditis. *Am. Jour. Med. Sci.* 1910, CXL, 516.
10. Osgood, Robert B. Orthopedic Aspects of Chronic Rheumatism or Arthritis. *Jour. A. M. A.* 1930, XCV, 992.
11. Meltzer, S. J. Bronchial Asthma as a Phenomenon of Anaphylaxis. *Jour. A. M. A.* 1910, LV, 1021.
12. Vaughan, V. C. *Protein Split Products in Relation to Immunity and Disease.* Lea and Febiger, Philadelphia, 1913.

MEDICAL EDUCATION AND MEDICAL PRACTICE*

C. F. Martin

Dean of the Faculty of Medicine,
McGill University, Montreal

I am fully cognizant of the honor you have conferred upon me by inviting me to address you. Indeed I regard your kind invitation as another symbol of the very cordial relations that exist, and, I feel sure, will always exist between McGill University and your distinguished Academy of Medicine, between scientific men throughout the English speaking countries of the world, and, more especially, between the British Commonwealth and this great Republic.

Already you have greatly strengthened the bond of friendship with McGill University through the election to your Honorary Fellowship of Professor Edward Archibald, one of Canada's most distinguished surgeons. Be assured that his admission into your eminent company has not passed unnoticed by his colleagues at home.

You have asked me to speak on "The Continued Education of the Practitioner." I do not know whether this title applies to post-graduate education in general or to that which is of benefit chiefly to the study of focal infections. In any case the subject of this symposium may well serve as a text for any discussion on medical education. The wide distribution of focal infections and their protean manifestations afford many and varied opportunities for study in both diagnosis and treatment of disease, and I shall have pleasure later on in briefly discussing the relation of postgraduate study to some of these fields. Public exploitation of one's views on medical education should perhaps be avoided, like the plague, and since last June, when in thoughtless haste I accepted your cordial and irresistible invitation, I have had abundance of leisure in which to repent of its acceptance.

*Delivered October 20, 1930.

Despite the undoubted progress attained in medical education many of its problems seem as insoluble as ever. The impression still obtains that all is not well with our medical schools, that the mass production, though improving, is yet far from the ideal, that the method of training, to be sound, must be further improved.

On the other hand, any *single* system for the education of physicians is bound to fail, because no two physicians start from the same base line, any more than two students when they enter on the study of medicine.

It is for this reason that the continued education of the physician cannot be severed from that of the medical student, nor from his pre-medical training.

Let us, therefore, as an introductory thought, consider briefly the subject of early school and college education.

The Preparatory School

Among the critics of existing conditions are those who point a finger of scorn at the *preparatory schools* and colleges, where, they claim, the laxity of discipline and want of respect for authority is all too apparent in the pupils. There can be no doubt that much is still left to be desired for a better personnel among the teachers in our schools and a greater appreciation of the dignity and importance of that office. If this criticism be sound, such a free and easy system stands in strange contrast to the inflexible rigid requirements of the university, as set down in our curricula of medical training. The insidious influence in the university of what has well been termed "syllabitis," has been all too fruitful of waste and misdirected energy.

In Europe it is the reverse; there the free and easy methods permitted in the universities form a striking antithesis to the rigid discipline of the gymnasium and of the école normale.

The Pre-medical College Training

Even if it be granted that here in North America all men are born equal, the fact is that they do not remain equal for any length of time. Some have the advantage of means, leisure, discipline, good schools, good masters and that indefinable advantage that comes from birth and breeding, besides that more obscure quality personal to each individual and inherent in himself alone. On the other hand, large numbers go through life handicapped in one or more of these privileges.

A striking feature of our modern system lies in the fact that medical education has, unfortunately, become far too much a thing apart. Upon the average college boy, who contemplates the study of medicine, is imposed a modicum of scientific subjects, which, in the short time at his disposal, he can learn only superficially, and that, too often at the sacrifice of cultural training. Despite the recent polemic of a distinguished surgeon denouncing as unnecessary a broad general education, one can only deplore its widespread absence. A university training, assuming it is worthy of the name, makes each part of the curriculum contribute something to the mental discipline and training of the student. Without it, life has a less dignified ambition and less expansive horizon.

I ask you for example, whether or not the lack of some classical training to the student of anatomy does not make its study a difficult feat of memory in nomenclature rather than a discipline in thinking and observation? The derivation and significance of the strange anatomical terms, he cannot appreciate. Is it, I would ask, our lower standards or the too specialized training that explain the obvious defects in his knowledge of English, its composition, its expression, and even its spelling, not to mention what is politely called his "conversation." A reading knowledge of some modern foreign language is similarly a requirement more honored in the breach than in the observance. To personality and character, breeding and the humanities, so fundamentally essential to the professional

man, greater attention may reasonably be directed, and opportunities afforded to cultivate these as an integral part of pre-medical training.

Undoubtedly, a great forward step was taken when the numbers entering the medical school were limited and a selection from among many was made possible. This limitation is essential to the maintenance of ideals and, to some extent at least, eliminates the really undesirable candidate. In this matter the Association of American Colleges has assumed a leadership of which it may well be proud, for standards have thus been raised and a definite degree of knowledge, at least on paper, has been exacted.

Let me merely emphasize again that upon the subject of preliminary college training as a matriculation standard for medicine, authorities are not all agreed—doubtful whether more of science, on the one hand, or of classics, literature and languages, on the other, is desirable.

The Medical Student

And now, the candidates come to the medical school, unequal in ability, unequal in training, unequal in capacity for work, differing in their predilections for study, yet are their certificates the same—tiresome in their uniformity—acquired after several years of labor.

Many students bring something more—they have already acquired academic degrees of various kinds in arts, science or philosophy. At McGill 86 per cent are so qualified, and in some schools the possession of the degree is obligatory. With the increasing pressure on medical schools there is little certainty that a student will be admitted unless he bring with him a bachelor's degree, and yet, so hampered are we by traditions that we compel all students, irrespective of their education, quality or experience, to follow an identical course for four or five years, after which they graduate, and still all, presumably, alike.

We are, I believe, all agreed that many students—be their credentials what they may—do not yet know how to

learn, how to observe or how to think. If, in his college course, he has concentrated his attention on the sciences —whereby he may learn by the experimental method how to think and observe—if he has used this method as his chief source of training, and thereby become efficient through so called self-education, he will in all probability have acquired his knowledge at the sacrifice of general knowledge and breadth of learning.

The generally accepted opinion of this country seems to be that students learn more through the laboratory by experiment and when left to their own resources, than they do in the lecture room or the clinic. For this reason, students are encouraged in research, and the better ones are segregated from those of average standing. If by research we simply mean the attitude of mind which every student should adopt, wherever his work may be, it is, after all, but another name for training in observation and judgment, no matter which line of work he may care to select.

The trouble is that the experimental method for the average student wastes too much time. Let the average student rather believe what the professor *tells* him—that there are 3600 seconds in an hour, instead of counting by the clock *for* an hour.

The average students, for the most part, have neither the desire nor the capacity to profit by the purely experimental method. In Europe they appraise more justly—in Germany only 3 per cent of students attain to eminence, in France 10 per cent, while in England 70 per cent never pass above the lowest grade for license, although every facility is at their disposal.

But, you will say, is it not often that the average men develop under the stimulus of experimental work, and that often a genius is uncovered? While this may apply to the exceptional case, it can never be considered the rule. And, in the preparation of students for the practice of medicine, it is not well that the one genius repentant sinner should take precedence of the ninety and nine who seek entrance into the kingdom of Esculapius.

Liberty of Choice

In our effort to teach enough, we offer more than can be absorbed—without this elemental minimum there is little time left for freedom of choice.

It is not difficult to obtain an overwhelming majority in favour of liberty in higher education, and, as Dr. George Vincent intimated long ago, it is somewhat of a reflection on this profession in America if we are obliged to confess that our students are neither prepared for, or worthy of, more latitude in study.

Nothing can be more ludicrous than to compare the curricula of different schools with respect to the importance attached to individual subjects, by the number of hours considered essential for the training. This wide variance in itself is ample proof of our unsettled views, and is further sufficient evidence in favor of the elective system. It is not good, of course, that all schools should be so standardized, nor that a student should proceed in lock step from class to class. Let the student, the unwilling victim of a "syllabitis," as it has well been called, work at a speed to suit himself, conforming only to the rules and regulations of the department, and controlled by the examination system of the university. Three general examinations alone should be necessary—one at entrance, one for the combined preclinical sciences, as in Edinburgh, and a final one to determine broadly his general fitness to practise his profession. Such examinations should test a student's knowledge and what he can do with the knowledge he possesses, rather than the facts he may have acquired. Such were the views of Franklin Mall. Course examinations are things to be deprecated—evidence not of knowledge and understanding, but of an ability to cram facts in a given space of time.

European students on entrance know fewer things than ours do, but they are better educated, more alert to find their way, more personally responsible, and, therefore, more free to choose to work their way *back* into subjects necessary to the understanding of a case.

The French student enters the wards on the first day. He comes into immediate contact with patients. He discovers that anatomy, physiology and pathology *may* be useful to him. Laboratories are open to him, where he can learn as much or as little as he likes, but always in the light of the patient.

Sir Andrew Macphail's complaint is that here on this continent we have allowed ourselves to become slaves to a system which is now outworn and alien to us.

The German student has entire freedom to move from university to university, where he thinks he can obtain the best teaching, which leads to emulation among the teachers. I am prepared to admit, however, that the German student is not always moved by the abstract desire for education. Too often he goes to a more genial climate, to a university where he knows the examination is easy, to a place where the society, the music, and even the quality of the beer, is entirely to his taste.

The English student is still an apprentice to a teacher.

But the French system, even with its model institutes for scientific study, is not for us. Its disadvantages come from the complete severance of university and hospital, and the examinations which terminate only with death.

Nor is the German system, with its professors ordinarii, extraordinarii and honorary—its famuli and private docents—even though for clinical study it is almost supreme.

I should like to see in our better schools, courses offered as freely as possible, to be taken when and where the student chooses. Courses of no value would then soon die a natural death. Demand and supply, competitive teaching and the inspiration of the individual professors will readily determine the method of suppressing either a poor student or a poor instructor.

It is high time that we boldly abandon the rigidity of our system, define the minimum work for each student—considering always his aim and whether his aspirations

lead him to practice, to specialism, to science or teaching. A return to the shorter period of study would soon result —a four years' course of nine months, or even a three years' course of eleven months each, with the added year of a guided hospital service. With an elective system in the better schools, and an honor's course throughout for students with academic ambitions and ideals, the path is well defined.

The Physician

Each country has its peculiar needs, but the need of humanity is an universal one, namely, to supply the physician, who will at most not be a menace to the community. After that comes the specialist, the scientist, the teacher.

There seem to be two rather contradictory opinions current among those who theorize on medical practice. The British teaching places diagnosis, by means of clinical observation, very high in the scale of medical duties, while the second method called by Herringham the "encyclopædic," demands not the formation of judgment on a case, but its suspense, and holds that function most high. Diagnosis is, in a sense, made a secondary thing, an object possibly of distant hope, like a future life, but not a thing to guide our action in the present.

The first thing deemed necessary is a complete and detailed study of the patient's state, *so* thorough that no cell remains unturned. As a rule the diagnosis is arrived at from documents furnished by a syndicate of special examiners—chiefly from the laboratories—and it may sometimes happen that the patient's untimely death renders null and void the incomplete though magnificent attempt. In the former case, where observation of the patient is utilized to its fullest limit, one tries, without jumping to any unreasonable conclusion, to make up one's mind on the diagnosis, and to make the best efforts of which the rude mind is capable, and which may be called common sense.

Now, I do not for a moment decry the laboratory aids—

far from it. To state in detail the enormous advantages that have accrued from careful analytical processes now available to the practitioner would be to write a large part of recent medical history. Yet the gain is not an unqualified one, for with it comes a new danger, viz., that the last word in the individual case is with the laboratory worker. But the patient remains, and ever should remain, the central feature of the problem. It is at the bedside—not in the laboratory—that the decision of the issue must be taken. In other words, laboratory methods should be used to enlarge, not to contract the area of personal observation cultivated by the practitioner.

The Teacher

Leadership in clinical teaching should be in the hands of men whose chief concern is the care of hospital and dispensary patients, the teaching of students, as well as the prosecution of research, and this combination is, I believe, struggling, more or less, successfully for recognition.

It is, I believe, scarcely recognised in medical education that the science and art of teaching is a special calling. The average professor of clinical subjects is far too much engaged with his daily routine to devote himself as an expert in pedagogy to the teaching of medical students.

It is interesting to read in Hawthorne's delightful medical essays his views on education, more especially with reference to the systematic lecture. "Practical instruction in the laboratories and in the hospital," he says, "has occupied an ever growing place in the curriculum, and in many schools the systematic lecture has failed to hold its own."

If the sole, or even the main, purpose of the lecture is to convey information, little can be said for the persistence of the lecturing system, and the purpose may be more successfully attained by the printed book. Books abound and some are good, and many cheap.

All the information which a teacher has to convey may

be presented on the printed page, with tricks of type and paragraph, apt for emphasis and for orderly perspective. Diagrams and illustrations add further values, and so it is argued it is the book and not the lecture that should be the modern educational instrument. The lecture survives by force of precedent and tradition, and the student would be better occupied in his study and the professor in his library and workshop. Such is the indictment urged against the lecture as a teaching method.

Candour compels an acknowledgment of the existence of lecturers who appear to forget that in an age of cheap printing, some achievement, other than the mere recital of facts, is necessary to justify their existence. They continue the ancient tradition, as out of date as witchcraft, and where the place of the principal performer could be effectively taken by the gramophone.

But the object of education is not solely the implanting of facts in the student's brain and memory. Teaching, or education, is much broader in its scope. Its purpose is not merely to inform the mind, but to develop and strengthen it, to cultivate habits of thought, reasoning and mental order, and to encourage a capacity for judgment for the weighing of evidence and for a broad and balanced outlook.

The ordered presentation of knowledge afforded by the book is, of course, the ground work of the student's equipment, but its framework is severe, inelastic, unemotional and is apt to present a somewhat forbidding front. It is only the exceptional writer who is able to confer on the technical textbook the qualities that excite an appetite for learning and provide the glow of enthusiasm and the need of human interest. Such were the textbooks of Hilton Fagge in medicine and of Erichsen in surgery.

If the profession is to be recruited from men of high mental calibre, ability and wide sympathies, there must be provided in medical life and training, not only the means of livelihood and an opportunity for craftsmanship, but

likewise those subjective influences which contribute to mental growth and development.

Systematic lectures should be an agreeable interlude of laboratory and ward work, a mental recreation and stimulus in which the personality and the character of the teacher—perhaps more even than the facts presented—leave an indelible impress on the student's mind.

I see signs on every hand that this system of ours is breaking down. The universities are demanding freedom, freedom to develop their own ideas, to apply their endowments, their prestige and facilities to the best general advantage.

To that end your Commission on medical education has rendered an inestimable service by placing before the profession a complete conspectus of medical education in Europe. The Director, Dr. Rappleye, has made an exhaustive survey of the methods in eight European countries. I am far from saying that we should copy any one, but we can learn much. Possibly, we can learn most from England of freedoom and competence, where all secure a training suitable for the general practitioner, and those who aspire to something more may qualify for the highest posts. In England there are 23 licensing bodies and 33 medical schools. No medical school attached to a hospital examines the student. They go when and where they like to be examined by such licensing body as best seems to meet their capacity and their future career. Their teachers do not burden their conscience with the learning or the passing of the students, but the good teacher is sure of a following. He teaches all the better because he does not examine and the students are friends and not enemies.

The Graduate

But, you will ask, what about the continued education of the practitioner, which, after all, was to have been the main theme of my message. I have already explained in extenuation of this long dissertation that one cannot well

dissever graduate teaching from the antecedent training. According to his special preliminary advantages of birth, training and opportunities, so will the graduate be guided in his later career.

Modern medicine has been demanding more and more access to laboratories and hospitals, which is essential to the growth and maintenance of professional power. The great majority of physicians, however, have had too little contact with these agencies, and relatively few take full advantage of the opportunity.

Continuation courses for practitioners represent a need in medical education worthy of very careful consideration. The clinical resources of a great city in a university setting alone offer an opportunity for the organization of graduate teaching. The success, however, depends as much on the segregation of the graduate students as it does upon the teacher.

Mass training in postgraduate work in detail is certainly not feasible, though much may be done with large groups to maintain their interest, to instruct and to entertain, and this can be done by lectures, clinics and demonstrations.

The graduate who comes, little knowing what he wants to receive, gains little except in a general way. Essential to the success of postgraduate teaching is proper segregation of the pupils. The younger graduate and the older, for example, must be treated on a different basis, for, in the effort to provide instruction, one is confronted by the problem of satisfying the needs of a variety of physicians of different tastes.

The ideal system, were it feasible, is that of an apprenticeship—the personal contact of the graduate with a master's mind, the sustained association with intellects that have better qualities and ambitions than his own.

The Recent Graduate

To the recent graduate comes either the opportunity for an academic career, a specialty, or both, or, again, the lure of general practice; and, according to his lights, so will the younger man select his path of advancement.

With respect to him who chooses an academic career, or a specialty, one cannot lose sight of the broadening of the science of medicine in the biological sense with the increasing tendency to include the pre-clinical sciences of the medical curriculum in the general university cultural program. All this has its bearing on future graduate study. Physiology, pathology, anatomy and even pharmacology are now open to students in our arts faculties and general college courses, and so men are encouraged to enter the study of pure sciences as a career.

Progress has been rapid in the science of living beings, their functions and disorders, and has so influenced the social, intellectual and material conditions of mankind that medical research of this type has bulked large in graduate study—assuredly this is all to the good.

It is this influence, moreover, as I have already hinted, that has guided so much the educational policy of the medical school, both graduate and under-graduate, with respect to the experimental method. For graduate study, leading to a purely scientific or academic career in medicine, nothing could excel it.

But, I would submit that this does not necessarily lead to the best type of practitioners of medicine, either general or special, and I still contend that for the recent graduate student, who is anxious to develop into a scientific practitioner, such absorbing scientific study may be overdone at the expense of skilled training in the clinical field. The practical study of the patient in the dispensary, in the wards and in the operating room, is of paramount importance to those who aim at the best type of clinical practice. So long as they train themselves to think logically and to observe accurately at the bedside, they can

learn an equally useful scientific attitude in similar fashion as they have already observed in the use of the microscope and the test tube.

This has been the Canadian attitude ever since clinical medicine began to be taught. Bedside observation and recording have always been compulsory for students in their later years.

It was this technique that Osler learned at McGill. McGill and the ancient University of Pennsylvania had inherited it from Edinburgh, which in turn took it from Leyden. It was Osler who introduced it elsewhere as he travelled.

The Specialist

It is a common practice on this continent for the recent graduate, desiring to become a specialist, to proceed after a very short internship in hospital at once into his chosen circumscribed sphere of work. This enables him to develop a technical skill and knowledge of no mean sort within a few years after he has left his university. Splendid opportunities of the kind are offered in many of our educational centres.

The graduate, however, enters upon his specialty, often without a preliminary general experience and medical training, not to mention an adequate knowledge of the humanities of general practice. It is the short cut tendency of our times, and our best students readily acquire the habit and are encouraged so to do, even by the presentation of scholarships to that end. The product, too, is often better than we suppose.

But, may not one question whether such a custom develops the most representative type in our profession? Does it ensure a continuance of succession to the great Titans of medicine, as were Sydenham and Louis, Gower and Allbutt and Osler, Billroth and Nothnagel, and the like? Should we not rather encourage the élite of our profession, who have the divine creative spark, to develop breadth as they become illustrious, culture as they become

distinguished, well informed on many sides, while they have the opportunity to rise as specialists in their particular chosen field?

Once entrenched behind an adequate preliminary general knowledge, a relatively modest intellectual effort is sufficient to hold one's ground. This is the truer, the more important and elevated the position that one has captured.

The Older Graduate

And what may one say for the continued education of the older practitioner—for him who absorbed in years of general practice has been allowed too little leisure for keeping abreast of medical progress—the pilgrim, who has awakened to a desire to change for a brief period the depressing atmosphere of the Valley of Humiliation for the stimulating triumphs of the Delectable Mountain of Knowledge? The answer is not so easy. Medical science has become so vast, so dependent on the biological sciences, and so highly specialized in every direction and the individual spheres of knowledge have become so interdependent, that a choice is difficult for him who seeks to gain a refreshment where progress has been so appallingly rapid.

Apart from the opportunities of wards and dispensaries, he will be confronted with the choice of study in laboratory technique, in highly specialized courses in serology, radiology or any of the similar advanced subjects of postgraduate study.

In his effort, for example, to study focal sources of infection he may learn to differentiate a normal from an abnormal dental condition, mere absorption from focal abscess of the teeth. He may even transilluminate, with some degree of skill, the sinus cavities, or detect an abnormal shadow in the actinogram. If more ambitious and lucky in his technique, he may acquire some dexterity in the newer methods of examination of the gall bladder, and even study the pyelograms of the normal and abnormal kidney, and he may familiarize himself with the diagnostic

study of cerebrospinal fluids, or learn bacteriologically the various types of pneumonia.

In such short courses, however, without the preliminary and more prolonged fundamental training he will not only fall short in manipulative skill but fail to appreciate the relative values of what he learns to see. Without experience and judgment he cannot expect to go very far, and there is no short cut to such an achievement.

There pours into these graduate, or "refresher," courses, as they are called, a number of men, each with individual ambitions and ideals, and each with a different zeal for knowledge. Each is staggered at the choice, uncertain how best to use his time. The danger lies in wanting to learn too much, in wanting to taste too many of the intellectual savouries of the banquet. He is apt to do as so many have done before him in Vienna and avail himself of so many courses that, at the end of his short weeks of study, he suffers from intellectual indigestion. Far better would it be for such a one to curb his ambitions, confine himself to the reasonable, restrict his interests to a limited sphere and by attaching himself to one service, or one teacher, whom he respects, and allow his mind to gain inspiration, knowledge, and a degree of judicial discrimination.

It surely is a joy to return to some great teacher who can urge to better things. After all, apart from this, what more can he expect to receive in so limited a time—a few tags of information, or some technical skill in a circumscribed field, or special tips on diagnosis or treatment.

But, these refresher courses should, in reality, do more. They should inspire while they inform. For, just as there is always a refreshment of knowledge and awakening of that renewed activity of mind that we call keenness, so should there also be an adjustment of outlook and an urge for higher ideals of work. Herein lie the great advantages of this Academy Fortnight—an unusual opportunity to accumulate experiences and inspiration, to acquire new insight into the progress of medical science and added skill in technical procedure.

Of further advantage, moreover, is it for those far from medical centres to come into the enlightening atmosphere of the Academy and therein to enjoy the fellowship of its distinguished members.

We in Canada, in addition to the usual graduate facilities, have adopted a procedure somewhat the reverse, viz., we select from our university staffs duly qualified teachers to visit the rural districts and endeavor to acquaint the physicians therein with the latest advances in knowledge.

There is one danger, obvious to all, lest in the limited training thus acquired the inexperienced practitioner gains some false sense of security from the newly acquired information (more especially in surgery) which he carries to the bedside of the individual sufferer.

The already trained surgeon may get useful information on operative technique; the practised internist may acquire added skill in certain highly specialized procedures of medical diagnosis, but to him who is untrained to carry to a useful conclusion these practices, with both discretion and judgment, a limited knowledge may become a menace to the public.

Mass production in higher types of graduate courses is virtually impossible, though the clinic, the demonstration and the lecture afford wonderful opportunities for inspiration and delight.

The British proposal to open a large new hospital with wards and laboratories solely for graduate study at the bedside, under the guidance of selected teachers, may prove satisfactory for the graduate of long standing. It is intended thereby to offer not only facilities for enlarging their clinical experience, but with added opportunities for observation and thought to afford a comparatively easy method of acquiring information and a new outlook.

But I have wandered too long and too far. For the practitioner there is only one means of acquiring continued education in the full sense of that term, and, from my own immediate observation, such an opportunity is being provided in some of your greater institutions.

A sufficient time, however, must be devoted to a given topic. In order that a detailed study in any branch of work may be of permanent value, at least six months should be reserved for it. A service devoted to such instruction under an authoritative guide, willing and able to impart and inspire, means much. The day of the separate postgraduate school is at hand. It should be an integral part of those few larger institutions, adequately equipped, and with a staff and prestige, to afford such facilities. Nothing is more lamentable than the half-baked graduate course offered by such schools that have neither personnel nor facilities.

For those who are willing to spend longer time—one, two or three years—opportunities for higher degrees might well be added. Internships, or staff appointments, with participation in the service, and not mere observation of others, offer to a man the practical work in which he is to become skilled.

I have but recently learned of a project here in New York that may well commend itself to those local practitioners seeking further knowledge in their special line of work—a program by which half of their day is devoted to a serious and systematic study in a given clinical field —over a period of three years—while during the remainder of their day they may continue as breadwinners in their private practice. The special course to which I make reference deals with surgery, but to this limited group encouragement is given to study, not alone in the operating room and wards, but in the laboratories of pathology, physiology and anatomy.

Great advances have already been made in postgraduate work and still greater are being developed. Nowhere is there a better chance than on this great continent, where educational conditions are untrammelled by the viscosity of conservative tradition—unimpeded through inadequate funds—and where keen progressive intellects and exceptional facilities abound on all sides.

ACUTE HEMATOGENOUS OSTEOMYELITIS *

Its pathology, with special reference to the involvement of joints, its diagnosis and the present day concepts of treatment.

FENWICK BEEKMAN
Attending Surgeon, Bellevue Hospital

There are few diseases of childhood which are more serious in their outcome than acute hematogenous osteomyelitis. Death, recurring attacks or permanent disabling deformities may follow its onset; consequently, its appearance is looked upon with apprehension. Because of the tendency to recurring attacks, the phrase "once infected always infected" has been applied to it.

Though the outlook, in many cases, is poor, a larger number of favorable results are now obtained than were formerly, due to the more rational treatment which has been developed. Because of this, fewer lives are lost, there is a decreasing number of patients with recurring attacks and there are fewer individuals with permanent disabilities.

The intelligent treatment of an infection of a bone is dependent upon a knowledge of the pathological changes which may occur during the disease. To obtain the best results, the treatment must be applied at the earliest possible period in the course of the disease. The surgeon is often unduly criticized for a poor result when he is not to blame, as his care of the patient did not commence until the osteomyelitis had developed into an advanced stage. Consequently, early recognition of the condition is essential; this most frequently lies in the hands of the pediatrician or "general practitioner." The local symptoms by which the diagnosis is reached can only be understood through a study of the pathological changes in the bone, as the diagnosis at this stage of the disease is dependent upon the presence of but a few signs. Therefore, it seems

*Delivered October 21, 1930.

wise to refresh our memory of the important pathological changes which occur.

Acute hematogenous osteomyelitis, at first, is an infection of the medulla of the metaphysis and, in the later stages, of all the tissues of the bone; the microörganisms having been brought to the metaphysis through the circulation. It is evident that such a lesion must be preceded by a bacteriemia, the bacteria having entered the blood stream through a portal of entry upon the body surface. Ordinarily, a bacteriemia is considered as a condition in which the bacteria remain in the blood stream continuously for a period of time and can be demonstrated by means of a culture. Though this occasionally occurs, it is not always possible to isolate bacteria from the blood at this period of the disease, either because the methods which are in use are inefficient in detecting them, or that they are but transiently in the circulation. Following the onset of the local bony lesion, bacteria may again enter the blood stream from this focus, producing metastatic lesions, which frequently occur in the bones, though occasionally, other tissues may become involved.

The disease varies in its intensity from a mild type of case with a well localized focus, to one in which there is a general blood infection accompanied by symptoms which over-shadow in intensity those of the local bony lesion. In this latter type of case, there is a general sepsis and from the blood of these patients, the infecting microörganism can usually be recovered by culture. Though in most cases, the local lesion is frankly suppurative from the time of its inception, occasionally one may be observed in which pus formation is not a prominent feature. These variations in the onset and course of the disease are due to different factors, among which may be mentioned the type and virulence of the infecting microörganisms, the amount of resistance of the tissues of the individual and the specific bone of the body which is involved, as well as the position of the lesion within it.

It is well known that acute hematogenous osteomyelitis

is a disease peculiarly confined to that period of life in which the bones of the body are undergoing their growth and that the lesion usually occurs in that part of the bone which is actively engaged in the production of growth. Though children between the sixth and thirteenth years of life are most often affected, it is not uncommon to discover the disease in younger or older individuals. A baby, ten days old, was admitted to the Children's Surgical Service at Bellevue Hospital, with a suppurative arthritis of the knee joint which proved to be the result of an osteomyelitis of the lower end of the femur, due to a bacteriemia from an infection of the umbilicus. Occasionally, individuals in the third decade of life develop typical foci.

The Staphylococcus pyogenes aureus causes seventy-five per cent of the cases of acute hematogenous osteomyelitis; this organism is found upon the surface of the skin of every individual and is the cause of the majority of the lesions of surface infections, such as furunculosis, impetigo and inflamed scratches and abrasions. Some one of these lesions usually acts as the portal of entry for the staphylococcus to reach the circulation, though often it is so small and insignificant that the actual focus is not discovered at examination. Apparently the staphylococcus remains but transiently in the blood stream, for if staphylococci are injected into the veins of a young rabbit, the microörganisms soon disappear from the circulation and after death are found in large numbers in the marrow cavities of the long bones. Apparently staphylococci behave in a similar manner in the human being, as the organism is demonstrated but temporarily in the blood stream.

Streptococci usually enter the circulation through the mucous membrane of the respiratory tract and remain in it for a longer period of time than do the staphylococci, for they appear to propagate in the blood. This organism can often be demonstrated to be in the circulation, by means of blood culture, over a period of weeks and even months. If this infection becomes localized, it is more apt to form its focus upon a serous surface or in the soft

tissues than within a bone. Only about a tenth of the cases of osteomyelitis are due to it.

In a few cases, the pneumococcus is the cause of the osteomyelitis, the bone focus often following a primary lesion in another part of the body.

Trauma is probably the predisposing element which determines the position of the bony lesion. Some accident, producing a slight injury to the bone, precedes the onset of the disease in at least sixty per cent of the cases. The trauma is apparently of a type that causes a twisting motion to the bone.

Boys are more often attacked by this disease than are girls. This is explained by the fact that the former are more subject to accidents than are the latter; first, that type of accident which produces cuts or abrasions on the surface of the skin, which may later become infected and act as a portal of entry and secondly, that type which may produce a bony injury which will determine the position of the osteomyelitis.

The bones of the lower extremities are involved three times as often as those of the upper because they are more exposed to trauma. The flat cap-like epiphyses of the lower end of the femur, upper end of the tibia, upper end of the humerus and lower end of the radius, are more easily displaced, causing slight trauma to the juxta-epiphyseal region of the metaphysis, than are those better protected epiphyses on the opposite ends of these bones, consequently, the points of election for the inception of this disease are in the former metaphyses. The tibia and femur are frequently involved and the lesion is usually at the end of the bone which forms the knee-joint, as this region is particularly exposed to trauma. Though the long bones are most frequently involved by osteomyelitis, it is not uncommon to observe a case in which the disease has attacked a flat bone, as one of those of the pelvis or a bone of the hand or foot.

In the majority of cases, the infection arises in that

portion of the metaphysis which is in contact with the epiphyseal cartilage and from there rapidly spreads out to the subperiosteal space and down into the medulla or into the neighboring joint. Rarely, the epiphysis may become primarily involved, which is followed by a rapid extension of the infection into the joint. Primary foci which occasionally start in the shaft of the bone, usually develop within the compact cortical portion and are often of low intensity and remain localized.

There are many explanations for the relatively frequent involvement of the juxta-epiphyseal region of the metaphysis, among these being the peculiar anatomical arrangement of the blood vessels, which was pointed out twenty-five years ago by Lexer, but there are two other explanations which stand out as strong possibilities of being the cause of the frequent involvement of this part of the bone. The first of these is the apparent lack of resistance of the cancellous tissue of the metaphysis to the invasion of the Staphylococcus aureus. Robertson (*J. Bone & Joint Surg.*, 19:8-23, Jan. '27) discovered that the marrow cavities of the long bones of young rabbits, which were killed soon after staphylococci had been introduced into their circulation, contained large numbers of these organisms. He further found active phagocytosis occurring within the shaft and epiphysis of the bone, but on no occasion did he find leukocytes containing microörganisms within the metaphysis. This led him to believe that the tissues of the metaphysis were not as fully protected against bacterial invasion as those of the shaft and the epiphysis. The second factor which appears to determine the position of the lesion is the predisposition of the juxta-epiphyseal region of the metaphysis to injury; any motion of the epiphysis and its cartilage upon the metaphysis, to which it is merely held in contact by means of the periosteum, causes damage to the vessels of this region and consequently, a slight trauma may cause a hemorrhage within this part of the bone and allow organisms that may be present in the circulation, to enter tissue of lowered resistance. The occasional lesion that develops in the bone

of an adult is situated quite as often in the shaft as at the end of the bone.

The infection becomes established within the soft cancellous bone of the metaphysis as a localized suppurative process, but seldom remains so for long. Occasionally, the resistance of the tissues may wall it off and confine it to a limited area within the bone and later, a wall of compact bone is built up about it producing a cavity lined with sluggish granulation tissue and containing pus from which the bacteria may disappear. This may remain in a quiescent state for many years and is known as a Brodie's abscess. Instead of remaining localized to the metaphysis, the early focus more frequently spreads, following the path of least resistance within the metaphysis, which is along the epiphyseal line between the soft new bone of the juxta-epiphyseal region and the surface of the conjugal cartilage, to finally emerge at the periphery of the bone beneath the periosteum, producing a subperiosteal infection.

If the epiphyseal line at the point from which the exudate emerges is intracapsular, that is, the ligaments of the joint are attached to the metaphysis, rather than to the epiphysis, the infection perforates the cellular osteogenic layer of the periosteum and enters the joint cavity. In our experience, this is a common cause of suppurative arthritis in children. Primary infection of the synovia, from the blood stream, with the Staphylococcus pyogenes aureus, seldom occurs. Roentgenograms obtained sufficiently late in the course of the disease will often demonstrate small metaphyseal lesions in cases of this type. This is the common pathway for a metaphyseal infection to spread into a joint, as the avascular conjugal cartilage acts as a barrier to the direct involvement of the epiphysis during the early period of the disease. The occasional lesion that forms in the epiphysis also perforates, into the joint, at an early period, producing a suppurative arthritis. Later, in the course of the disease, the cartilage may disintegrate and the neighboring joint become involv-

ed by the infection spreading to the epiphysis and thence into the joint.

A subperiosteal abscess is formed when the point from which the pus makes its exit is extracapsular, the periosteum being stripped from the surface of the bone. The periosteum, under this condition is seldom perforated as the osteogenic layer is strengthened at this point by a tough fibrous layer which is continuous with the joint capsule. Previous to the formation of pus beneath it, the periosteum becomes congested and œdematous and is easily stripped from the surface of the bone, except at those points to which ligaments, fascial septa and muscles are attached. The periosteal vessels which enter the bone with the fibers of Sharpe, are damaged and the circumferential circulation of the bony cortex is destroyed. Though it is possible that the large medullary cavity, in the shaft of the bone, becomes involved by direct extension from the metaphysis, it is more probable that this involvement is brought about through the subperiosteal pathway as suggested by Starr (*Arch. Surg.*, 4:567-587, May '22), that is, the infection, having reached the subperiosteal space, travels down beneath the membrane and thence into the medullary cavity through the vessels of the cortex, by means of the haversian canals. This theory appears more tenable than that of direct extension within the bone, as the involvement occurs so rapidly that it is hard to conceive that an infection could break down the cancellous bone in the metaphysis in such a short period of time. Furthermore, secondary lesions often form within the medulla at the opposite end of a bone without involvement of the medullary cavity of the shaft; this can be explained as either metastatic in origin or due to an extension by means of the subperiosteal space. And finally, experience has taught us that further extension within the bone is not likely to occur, if an early lesion within the metaphysis ruptures into a joint or is drained. There is a rapid extension of the infection within the large marrow cavity following its involvement and this is accompanied by destruction to the circulation of the medulla. Later, the

infection may perforate the periosteum, enter the tissue planes of the soft parts and finally point beneath the skin.

The ultimate effect of suppuration, within the bone, is osseous death. This is due to an ischemia, the result of the destruction of the circulation. The blood supply of the diaphysis of a long bone is obtained from two sources, the nutrient and the periosteal arteries. The nutrient artery enters the medullary cavity of the shaft and divides into ascending and descending branches which distribute the circulation to either end of the bone. The periosteal arteries enter the cortex of the bone from the periosteum. The thick compact bone of the cortex of the shaft receives the blood from small vessels which enter it from both these systems. At the metaphysis, the periosteal vessels are larger and they perforate the thin cortex and anastomose freely with the branches from the medullary circulation. This arrangement of the arteries affords the bone a free blood supply by which a collateral circulation is easily established if one system is destroyed. Consequently, to produce a massive death or sequestration of a part of a bone, both systems to that part must be coincidently damaged, the size of the sequestra being directly proportionate to the amount of damage which occurs. Certain bones of the body are subject to the formation of larger sequestra than are others. The entire shaft of the tibia may sequestrate, while a like occurrence in the femur is rare. This can be explained by the fact that the periosteum of the tibia is easily stripped from the cortex by the products of infection, as the bone is superficial and has few muscular attachments upon its surface, while the shaft of the femur has many muscles attached to it as well as an intramuscular septum which is adherent to the entire extent of the linear aspera.

Sequestration of an entire metaphysis is relatively rare and the fragments of bone which do separate from it are smaller than are those that sequestrate from the shaft; this is due to the ample blood supply of the former, as well as to the fact that its periosteum is not easily stripped be-

cause of the many muscular and ligamentous attachments upon its surface. The sequestration of an entire diaphysis of a bone is uncommon. When a shaft sequestrates, the separation occurs between the tubular portion and the cancellous bone of the metaphysis.

Shortly following the onset of the infection the body of the individual reacts by instituting processes to remove the dead tissue and replace it with new. The bone which has been depleted of its blood supply becomes separated from that which is alive by the action of phagocytes and new bone is formed upon the inner surface of the separated periosteum; this is known as the involucrum. The continuity of the damaged bone is usually renewed, through the formation of involucrum, by the time that the sequestrum has fully separated. If the involucrum fails to form, a loss of the continuity of the diaphysis may follow; this is the result of damage to the cells of the inner or osteogenic layer of the periosteum and follows in those advanced cases in which there has been a separation of the periosteum from the entire circumference of the shaft and in these cases the periosteum may be found to be sloughing.

Due to neglect, or through faulty operative technique, the epiphyseal cartilage may become damaged, allowing the infection to spread from the metaphysis directly to the epiphysis and finally into the joint. If the entire epiphyseal cartilage is destroyed, a premature bony union occurs between the epiphysis and metaphysis and growth ceases at this end of the bone. This results in a shortening of the limb, when the involved bone is single, as in the case of the humerus or femur, but causes disabling deformities if it be one of a pair, as in those of the forearm or leg. More often slight injuries to the cartilage occur which merely result in a retardation of growth.

In the milder types of case, the osteogenic function of the epiphysis may be stimulated, producing an increase of the longitudinal growth; this over-growth may amount to as much as an inch.

A pathological fracture may occur during the period of bone destruction, before sufficient involucrum has formed, or later, because of insufficient formation of involucrum. Fractures at the end of the bone occur earlier in the course of the disease than do those of the shaft. The former are frequently the result of an attempt to move the neighboring joint forcibly and the latter to the too early removal of a sequestrum.

The most common complications of acute hematogenous osteomyelitis are metastatic lesions. These occur in any of the tissues of the body, but in staphylococcus infections, the secondary lesions are usually within the bones. They occur in from fifty to sixty per cent of the cases and may develop at any time during the course of the disease. In the fulminating type of case, as many as a dozen of these lesions may appear within the first few months, but in the less severe case, the lesions usually occur at longer intervals. Each succeeding lesion is less severe than the preceding one and the pus from a late lesion, in a case in which there have been many recurring attacks, may be found to be sterile. The pericardium is more susceptible to metastatic involvement than other serous surfaces and the danger of the development of suppurative pericarditis is always present in the fulminating type of the disease.

The prognosis of acute hematogenous osteomyelitis depends upon several factors, the most important of which is the character of the onset of the disease. Death occurring in the course of an attack is usually due to the blood infection and often occurs during the first ten days of the disease. The deaths which take place later, may be due to secondary septic lesions, such as suppurative pericarditis or pneumonia. Many patients, with the fulminating type, succumb to the blood infection before the local bony lesion has fully established itself. There are other cases in which the bacteria remain in the blood for some days. This is a sign of danger; however, children with this condition may recover, though they usually develop metastatic lesions.

The symptoms that are present, in an individual case, of acute hematogenous osteomyelitis, may be entirely due to the local lesion or partly the result of a general blood infection. Consequently, they differ in quality and also vary in intensity.

The symptoms of a patient, in which the bone lesion is well localized, are those due to the reaction of the tissues in the region of the focus with accompanying constitutional symptoms due to the toxemia, but these latter are often mild and occasionally entirely lacking. The character of the lesion in the mild type of case may not be suspected for some time, for the focus which is localized within the bone displays signs that are not pronounced and these may be misinterpreted. In the more progressive type of case, the infection soon spreads out to the subperiosteal space or into the joint and may be mistaken for an abscess of the soft parts or a primary suppurative arthritis.

The descriptions of the local symptoms, as found in most of the text books on surgery, are faulty, in so far as the authors do not stress the signs that are present while the infection is still confined within the metaphysis, but rather spread themselves in their description of those which develop because of the involvement of the overlying soft parts. The list of early symptoms of a metaphyseal involvement contains but few of the classical signs of inflammation. The child complains of pain in the region of a joint and refuses to use the limb, but can be persuaded to bend the joint. To inspection, there appears to be little wrong with the area complained of, for there is no swelling or redness of the part and there may be no increase of the local temperature of the skin. An older child will occasionally show enough coöperation to point out the position of the pain, but usually, the individual is of little help, merely complaining when the diseased region is manipulated. A thorough examination must therefore be made to discover, if possible, a localized point of bony tenderness situated over the end of one of the bones, which

is the diagnostic sign of the disease at this stage. In searching for this point, the surface of the limb is carefully palpated with the tip of the finger, beginning at some distance from the suspected area. This tender spot is well localized and is commonly situated in specific areas of each of the metaphyses. The tenderness elicited in a synovitis is over the joint capsule, while that of an inflammation of the soft parts is diffuse and these are both accompanied by swelling, redness and increased temperature of the tissues.

The symptoms appear suddenly in the fulminating type of the disease. There is a complaint of pain in the affected part and the body temperature rapidly rises; frequently, the pyrexia is ushered in by a chill and the child may vomit and often a state of delirium follows. The polymorphonuclear leukocytes of the blood are increased and a bacteriemia can often be demonstrated by means of blood culture. Because of the severity of these constitutional symptoms, the local lesion may be overlooked until the cortex of the bone has become perforated and an abscess has formed beneath the periosteum, or a suppurative arthritis has developed. This type of case is frequently treated for acute inflammatory rheumatism and occasionally it has been mistaken for a meningitis. The correct diagnosis can only be reached, at this stage of the disease, by means of a careful painstaking examination, as the only local sign which is of diagnostic importance, is the localized point of tenderness over the position of the lesion.

Acute osteomyelitis is most often mistaken for acute rheumatic fever. This is probably due, in a great many cases, to the lack of a complete physical examination, which would have revealed the bony tenderness, rather than to the misinterpretation of the symptoms. Infantile scurvy has been mistaken for the mild type of osteomyelitis and is a possibility to be considered. However, it should be easily ruled out by means of a history of artificial feeding and further findings, such as the characteris-

tic changes in the gums. Tuberculous lesions of the bone are gradual in their development and run a chronic course. Tuberculosis and gonorrheal infection of the joints, though occasionally mistaken for osteomyelitis, should be easily differentiated, as the local signs are confined to the region of the capsule of the joint, as occurs in the case of rheumatic fever.

Emphasis should be laid upon the fact that the x-ray is of little positive diagnostic value during the early stage of an attack of acute hematogenous osteomyelitis, as it is only of importance when there are changes in the structure or opacity of the bone; consequently, bony lesions cannot be demonstrated unless there be absorption or the deposit of calcium salts and these changes do not occur in the early stages of an osteomyelitis. Later, at the end of a week or two, evidence of osteoporosis or the shadow of a newly formed involucrum may be observed.

An individual suffering from acute osteomyelitis should be considered as an emergency case and immediately operated upon and the sudden appearance of toxic symptoms, accompanying a point of localized bony tenderness in the region of a metaphysis of one of the long bones should be sufficient indication for such an operation.

The objects to be obtained by treatment are, first to eliminate the focus of infection and second to combat the established toxemia. In the past, procedures were adopted which aimed to remove the seat of infection immediately in a complete manner and the metaphysis or diaphysis was resected "en masse" under the assumption that the entire focus within the bone could be eliminated at once. This was a radical procedure and undoubtedly, in a few cases, produced spectacular results, but more often ended in catastrophies; fresh fields of infection were established, the diaphysis of the bone failed to reform or the epiphyseal cartilage was damaged. The most universally used operation was one that made a long incision through the soft parts over the bone, stripped off the periosteum, removed an entire wall of the diaphysis and curetted the

marrow cavity. This procedure destroyed whatever defense the tissues had established, disseminated the infection and damaged the remaining blood supply of the bone. Consequently, there was a large sequestration, the convalescence of the patient was prolonged and greater deformities were produced.

The bone lesion of acute osteomyelitis should be considered in the same light as any suppurative process within the body. The tissues within the metaphysis endeavor to localize the infection by walling it off as do the soft parts in a simple abscess. Later the suppurative process points, in an effort to evacuate the pus. The difference between suppuration within the bone and in soft tissue is that the former is more deeply placed and lies within a hard, non-expansible tissue, consequently, at first, there is a greater tendency for it to spread within the bone, if exits are not provided to relieve the tension. Therefore, the primary indication in the treatment of a metaphysitis is to provide an opening in the cortex for drainage at the earliest possible period. In the drainage of the focus, a sufficiently large opening should be made through the cortex of the bone, to keep the cavity empty and this should be accomplished without unduly damaging the remaining blood supply of the bone. Therefore, the periosteum should not be widely stripped, nor should the medullary contents be traumatized. The relief of tension, by simple drainage of an early focus, prevents the spread of the infection and eliminates the development of sequelae and complications which might otherwise occur.

The procedure is as follows: Immediately upon admission, the patient is examined and the point of maximum tenderness over the bone is determined. This point is marked upon the skin. The individual is then anæsthetized and the limb prepared for operation. A sufficiently long incision is made, over the marked area, through the skin and soft tissues, down to the periosteum. The periosteum is often found to be œdematous and strips easily, or it may be separated from the surface of the bone by a

small accumulation of pus. The periosteum is incised and its edges retracted. The bone is drilled in three or four places with a quarter inch bit or burr, care being observed not to damage the epiphyseal cartilage. One of these holes should be placed close to it. If a drop of pus, followed by free bleeding, is obtained, the probability is that the infection has not destroyed the circulation of that part of the medulla. If pus alone is evacuated, the medullary circulation has evidently been damaged. The opening through the cortex can then be enlarged by removing a small piece of bone with a chisel. The wound in the soft parts is lightly packed with vaseline gauze and a dry absorbent dressing applied, after which the limb should be splinted. If a sub-periosteal abscess is found, the incision of the periosteum is usually sufficient, as the cortex of the metaphysis has evidently been perforated.

The temperature of the patient, following operation, should commence to fall before twenty-fours hours has elapsed. Occasionally, it may rise again in a day or so and possibly signs of a second lesion at the opposite end of the bone or in another bone are discovered; this should be dealt with in the same manner as the first lesion. The wounds are dressed daily and the exudates removed from their surfaces. Carrel tubes may be placed in the wound of the soft parts and the exudates dissolved with Dakin's solution. Occasionally, the sinus in the soft parts contracts and has to be enlarged, but it is seldom that further openings will have to be made in the bone, until sequestration has been completed.

An arthrotomy is performed in those cases which develop a suppurative arthritis. The osteomyelitis in the metaphysis seldom extends, following its perforation, into a joint and free drainage of the joint is all the operative procedure that is required. Drainage tubes and other foreign bodies should not be placed within the synovial sac. The results obtained in the cases of suppurative arthritis which follow a metaphysitis, have been satisfactory, if the joint was drained sufficiently early.

There is hardly room in this communication to discuss the subject of such operative treatment as is required following the subsidence of the acute inflammation, however, it must be stated that this should be of a conservative nature. Sequestra should not be removed until they have fully separated and sufficient involucrum has formed. The same care in operating should be observed, to preserve the circulation, as would be during the acute stage.

The general care of the patient, during the acute stage, should be that which would be prescribed for any case of a toxic nature. The child should have plenty of fresh air and nourishing food, the fluid intake should be increased and hypodermoclyses, containing glucose, given if the individual is unable to retain fluids by mouth. Frequent transfusions of small quantities of blood are of extreme value, during the toxic stage, in increasing the resistance of the individual and are also useful in building up strength during convalescence.

Since adopting these more conservative methods of dealing with acute hematogenous osteomyelitis, there has been a reduction of the mortality and an improvement in the morbidity in the cases treated on the Children's Surgical Service of Bellevue Hospital. There have been fewer complications and disabling deformities; consequently, the period of hospitalization, in the individual case, has been shortened.

In conclusion, I wish to lay stress upon the facts that the successful treatment of a case of acute osteomyelitis lies in an early recognition of the disease, followed by immediate operation to drain the suppurative process within the metaphysis, before it has had time to spread.

ACUTE INFECTIONS OF THE URINARY TRACT *

JOSEPH F. McCARTHY**
Director, Department of Urology,
New York Post Graduate Medical School

To achieve even an approximation of adequacy in the consideration of so comprehensive a topic as acute infections of the urinary tract, it is absolutely essential that one should always have in mind the object to be accomplished.

These highly constructive medical fortnights, so-called, conducted under the auspices of the Academy, are primarily intended for practitioners of medicine, to provide an intensive review of the cardinal points in the respective fields of medical activity, to stimulate those who in the nature of things are susceptible to such stimuli, to act as liaison officers in their contacts with recent advances in medicine and to adequately evaluate such advances.

To inject, therefore, controversial or speculative matter into the general theme of these lectures—to clutter with a plethora of statistical data or to involve them with over elaboration of technical detail, serves but to defeat the essential purpose of this laudable project.

With this in mind obvious liberties will be taken with title and subject matter—border lines crossed and recrossed, certain features stressed, others minimized, dismissed or forgotten, because of time limitation and the intent of this paper—practicality.

The routes of infection may be by means of the blood stream—the lymphatic channel—vesico-renal reflux—any

*Delivered October 21, 1930.

** In collaboration with Dr. J. Sydney Ritter, Department of Urology and Dr. Nicholas M. Alter, Department of Pathology, New York Post Graduate Hospital.

obstruction to normal outflow, whether extrinsic or intrinsic—direct extension—instrumental manipulation—accidental or otherwise.

The renal cortex manifests aristocratic tendencies in its receptivity to bacteria. While it is reasonable to assume that many and diversified representatives of the bacterial world enter the cortical zone, it is equally obvious that they are promptly consigned to the lower regions, before they have had the opportunity of leaving behind evidences of their customary belligerency.

On the other hand, this cortical structure is particularly susceptible to the advances of the staphylococcus and the streptococcus groups, whereas the medullary zone is the principal field of activity for the tubercle bacillus.

The chief route of advance of the above group is hematogenous and while they undoubtedly arise in some part of the body remote from the kidney—insofar as the genitourinary system is concerned—they may be regarded as primary. By this is meant that, with but an occasional exception, they are not the secondary outcome of an antecedent infectious lesion in the lower urinary tract.

Considerable difference of opinion exists upon the ability of the kidney to filter bacteria, without damage to its structural integrity; but because of the frequency of bacteriuria and the fact that bacteria are detected in the urine where no demonstrable renal lesion is present, it may reasonably be assumed that such bacteria can, and do pass through the organ, without occasioning anything more than, at the most, a temporary lesion.

In our recent investigations into the question of bacteriophage, the observation has been made that cases presented themselves wherein, under the most meticulous aseptic precautions, pathogenic bacteria were cultured from bladder and ureter catheter specimens, whereas subsequent cultures, on the same cases, proved to be sterile, despite the fact that neither local nor systemic therapy had been instituted in the interim.

Clumps of microörganisms can form emboli completely plugging the glomerular capillaries. Such a lesion may lead to a variety of pathologic changes, such as necrosis of the glomeruli, hemorrhage and finally to cortical abscess with a surrounding zone of polymorphonuclar leucocytes. Where these bacteria collect to form large clumps and thus obstruct the lumen of the tubuli, they then become the center of a growing abscess.

Tubercle bacilli usually produce this type of lesion with subsequent caseation or cavitation of the pyramids.

Staphylococci often produce tumor-like, diffuse, suppurative abscess. These are not unlike the carbuncle (furuncle) of the skin. Israel called this lesion "carbuncle of the kidney." Such staphylococcus carbuncles will often open to the capsule of the kidney giving rise to a so-called perinephritic abscess. Second, if a larger vessel is occluded by an embolus containing virulent bacteria a corresponding area of kidney parenchyma will not only necrotize, but will also soften to form confluent suppuration. Streptococcus or staphylococcus and, less frequently, tubercle bacillus, may be found in these lesions. Tubercle bacilli soon are mixed with pyogenic organisms.

Finally—a whole kidney can become the site of a septic infarction.

These lesions may undergo one of two types of evolution. Either they effect communication with the tubuli and in turn the calyces and renal pelvis, in which event they may follow a relatively quiescent course with pronounced urinary manifestations, or secondly, and perhaps more frequently, may extend toward the renal capsule resulting in cortical or perirenal abscess with accompanying negative urinary findings, and pronounced systemic signs.

Cortical abscess pointing toward the capsule perforating into the perinephric space, or peri- or paranephric abscess with or without penetration of the renal substance, will be treated here as a clinical entity.

This condition is notable for its sudden onset. Frequently there is obtainable an antecedent history of a minor or major infectious process, remote from the organ, as infected finger, peritonsillar abscess, carbuncle, pneumonia, pleurisy or other conditions occasioning bacteriemia.

Localized pain and pronounced tenderness in the costo-lumbar space when associated with the constitutional manifestations as herein described, should focus attention to the probability of perinephric abscess. The condition may be inaugurated with, or its course attended by, chills. Temperature of a fluctuating or septic character is almost always present. The individual is obviously a sick patient of the septic type with a high leucocyte and differential count. The localized pain, though frequently severe, is generally supportable, and while usually limited to the costo-lumbar space, it occasionally extends downward.

There may or may not be tumefaction dependent upon its duration. There usually is present, muscular spasm. In advanced cases, surface hyperæmia and venous stasis may be noted.

On palpation tenderness is the first observation. On gentle ballottement this becomes accentuated. It should here be stressed that gentleness in the examination of such a patient is imperative. Without commenting on our needs of the past, there obviously is no further occasion for so crude a test as the Murphy sign. Urology has advanced to a stage where a punch in the back to ascertain the presence of a kidney lesion should no longer find its advocates. In this condition it is positively dangerous. Palpation further elicits a sense of deep seated resistance or an ill defined tumor mass. Where the case has been under observation a number of days and on palpation there is an observable increase in the size of the mass, this may be regarded as pathognomonic of the lesion.

While under certain conditions it may be justifiable to employ an aspirating needle as an aid to diagnosis, we neither use nor advocate its use in this condition.

Too much reliance is not to be accorded the usual renal colorimetric functional tests: at best they reveal a lessened output on the affected side. Cultural test of the urine in such cases should be, but is not, the rule.

The findings resultant from a preliminary x-ray are entirely dependent upon the extent of the lesion. In its earlier stages its findings may be essentially negative. Later as the condition progresses there is a blurring and loss of the customary outline. There is also frequently noticed an absence of the psoas border and a deviation of the spine toward the affected side. The latter observation is not as dependable as would appear. Cases have come under our supervision, and proved at operation to be perinephritic, in which no such deviation occurred.

X-ray of the lower thoracic region should supplement the renal study as an aid in the differential diagnosis from subphrenic abscess.

Pyelographic study: With the contention of some observers that the procedure should not here be employed we do not find ourselves in accord. When isotonic solutions of sodium iodide are used, which is our custom, untoward manifestations rarely occur, and, if they do occur, are of minor import. There may be noted distortion, narrowing and elongation of renal pelvic outline, resulting from tumor mass compression.

Preceding this instrumental method, Uroselectan should be administered intravenously and several x-ray films taken. This may, in favorable cases, at once establish the diagnosis and obviate cystoscopic instrumentation.

Difficulty may at times arise in the differential diagnosis of perinephritic from subphrenic abscess, diaphragmatic pleurisy, retro-cæcal appendicitis. But an experience of many years in the observation of this condition, in its manifold phases, convinces us, these difficulties are much over rated.

At once it should be emphasized that the viability of a kidney involved by this lesion is almost wholly dependent

upon the diagnostic acumen of the practitioner, who, generally speaking, is the first in attendance. A patient coming under observation wherein even the possibility of such a condition is suspected, should immediately be hospitalized. Because the diagnosis once made, prompt operation is the indicated procedure. Avoidable delay may result in complete renal destruction and attendant removal.

As is well known, this serious kidney lesion may eventuate from relatively inconsequential, remote infection. It is obvious, therefore, that all such manifestations should be regarded with adequate seriousness and the fact remembered that apparently minor and remote infections have in themselves the potentiality for real trouble. The treatment, generally speaking, is surgical, but time does not permit of description of these methods.

As to viability of the patient, prognosis is excellent for the reason that where nephrectomy is indicated it should almost always be a two stage procedure. In advanced conditions the prognosis as to viability of the kidney is poor. Where, however, the diagnosis is made early and not too much destruction of kidney tissue involved, it is frequently possible to salvage the latter by adequate drainage.

Conclusion: It is obvious, therefore, that in the majority of instances the outcome at least, insofar as the kidney is concerned, rests in the hands of the practitioner. His responsibility is great.

Pyelitis—As its name implies, is an inflammatory process of bacterial nature involving in its ealier stages, at least, the renal pelvis and calyces—uncured or unresolved, it may and frequently does extend to the renal cortex, when it is called pyelonephritis.

It has long been regarded as one of the many prerogatives of the female sex, women and children, but as our knowledge of this affection extends, an increasing number of cases are recorded in the male.

Etiology—Again it is to be noted that this lesion fre-

quently takes its origin from a source remote from the urinary tract.

The author is of the belief that urinary stasis or back flow is a frequent contributory cause in the development of a soil suitable for the propagation of these bacteria, with its attendant consequences.

These factors will be elaborated under Pyelonephritis.

Increased mobility of the kidney, tubo-ovarian disease—gastro-intestinal stasis—the great variety of vaginal bacterial flora, the shortened urethra, pregnancy, the frequency of pelvic and abdominal operations, the inter-relationship of the lymphatics of the female genitalia and the ureter, may be considered among the reasons why the disease is so common in the female. Infectious diseases, focal infections and gastro-intestinal stases or obstructive lesions may give rise to pyelitis regardless of sex.

Here again the blood stream is undoubtedly a frequent carrier of bacteria or their irritative by-products which when brought to the renal pelvis may, under favorable conditions, give rise to pyelitis. Temporary bacteriemia is doubtless of frequent occurrence, occasioning trouble only when conditions favorable to their obstruction arise. The rôle of the lymphatic system has not been so well established.

The colon bacillus and its many varieties preponderate.

Typhoid and paratyphoid are well known blood invaders of the renal pelvis.

Other organisms may produce a hemorrhagic catarrhal type. Influenza, pneumococcus, and streptococcus bacteriemia may induce small or larger areas of hemorrhage. The theory has been advanced that many cases of the so-called essential hematurias may find their explanation in these acute or recurrent attacks of pyelitis. If there be even a measure of truth in this suggestion, it would appear advisable to culture such hematurias routinely.

Dependent upon the type and virulence of infection and the individual affected, the symptoms may range from the fulminant type with chills and fever characterized by pronounced temperature excursions, prompt elevation followed by precipitate fall. The constitutional symptoms customarily accompanying high fevers are usually present. They generally moderate or disappear with the subsidence of the temperature. Acute simultaneous bilateral pyelitis is of infrequent occurrence.

The signs and symptoms of cystitis ordinarily accompany this condition.

Urgency, frequency, dysuria, pyuria, are all sufficient for a diagnosis of cystitis. Hematuria may also be noted.

A scrutinizing antecedent history will bring out facts having a bearing on its probable cause, and a catheter specimen for culture and microscopic study confirms its presence.

Blood culture is the rule—as should also be chemical blood examination—leucocyte and differential count.

Here the local findings are not so pronounced as when cortical or perirenal abscess is present. Local tenderness is a common observation, but generally speaking it is not proportionate to the severity of the symptoms.

The management in the acute stage should be expectant rather than provocative. Elaborate instrumental and radiographic study (save for an ordinary flat plate exposure) are at this time contra-indicated. In this stage of the disease the patient should be made as comfortable as possible in the usual manner. Dietetic regulations and forced fluids, urinary antiseptics so-called, or the alkalies may be administered. They at least afford a measure of comfort to the physician, if they fail in relieving the patient. Urotropin or the citrates in large doses are the only drugs that offer a measure of solace to the author.

In any event, they should no longer be administered empirically. Coincidental studies of the hydrogen-ion con-

tent (the quantitative acidity or alkalinity) of the urine should be made. One is thus better informed as to the effectiveness of such agents, and as it is a matter of common knowledge that certain of these bacterial invaders thrive in acid media, while others flourish in alkaline, one is thus better prepared to provide discerningly an uncomfortable environment for their disturbing activities.

Culture of the urine is essential. From this is to be learned, first the specific bacteria, and secondly, if a phage or lytic substance antagonistic to the germ is to be had.

Bacteriophage implies a filterable virus, an ultra-microscopic organism, or an enzyme existing in the filtrate which may be obtained from waste products such as sewage. It probably is an ultra-microscopic organism, because of the fact that the presence of urotropin or acriflavine in such urine may inhibit the action of the phage, without destroying the organism producing the disease.

This filtrate is cultured to prove it to be bacteria free, then added to a culture of the organism obtained from the patient and if it destroys these bacteria in vitro, it is then given subcutaneously as well as by instillation into the bladder or renal pelvis, or both. For the past six months extensive investigations of the possibilities of bacteriophage in the treatment of pyelitis, have been undertaken by the Departments of Bacteriology and Urology at the New York Post Graduate Hospital. While it is still too soon to publish our observations, it may be stated that, though many failures have been encountered, we have seen a sufficient number of brilliant results, obtainable by no other method, to warrant the conviction that bacteriophage should be administered in suitable cases, and in any stage of the disease.

Routine stool studies, chemically and bacteriologically, supplement the foregoing. These specimens should be collected in sterile containers and the external parts previously sterilized. Insufficient thought has been or is

given these rational prerequisites. Colonic irrigations in right-sided pyelitis should be withheld until appendicitis has definitely been ruled out.

Blood chemistry investigation is advisable as the acid base balance of the blood in a large series of cases may add to our knowledge of the subject. In any event, it should always be known during the administration of acids or alkalies, especially in large doses, as these drugs may of themselves induce acidosis or alkalosis.

Uroselectan is administered intravenously, followed by serial x-ray photographs. This new agent tells us the precise function of both kidneys, and in the author's observation has demonstrated reno-ureteral congenital anomaly, when such abnormality escaped observation on previous cystoscopy and ureteral catheterization. It can also be carried out in any stage of the disease.

On the other hand, it may be misleading, in that it occasionally fails in delineation of the renal pelvic outline. It certainly cannot indicate the presence of vesico-renal reflux or back flow from the bladder to the renal pelvis—an observation made by the author in a case of pyelitis in a young girl, where a vesiculogram was taken. This method of examination should never be overlooked.

Uroselectan does not and cannot, nor is it intended by its authors, to supplant cystoscopy and pyelography. Its administration should be carried out only by those qualified to administer it, and interpret its findings. In our hands it has been a life-saving agent and too much credit cannot be accorded those to whom we are indebted for this new and epoch-making discovery.

In the subacute or chronic stage, cystoscopy, ureter catheter specimens are obtained for culture and microscopic examination supplemented by renal functional tests. In this manner one definitely ascertains if one or both kidneys are involved and to what extent.

Later in the disease renal pelvic lavage is a popular and frequently an effective form of treatment.

Accompanying the preceding, one should find and remove the primary focus as well as uretero-renal pelvic structural defects or malposition of kidney.

Colonic irrigation, medicated or not, is helpful in selected cases.

The preceding suggestions appear to be a large order but the disease is a rebellious one that calls for a diversified armamentarium. These, however, are of little value unless discriminatingly selected and considerately carried out.

Acute pyelitis may resolve, or terminate in a subacute or chronic pyelitis or develop into acute or chronic pyelonephritis.

PYELONEPHRITIS is a suppurative inflammatory process involving renal pelvic and kidney substance. This, as well as most of the text book descriptions, gives no real clue to the process either as it exists or as it develops.

Uretero-pyelonephritis will be grouped as a corollary of this condition.

Tuberculous pyelonephritis probably originates in the medullary portion of the kidney substance coming of course by blood stream from elsewhere in the body, later takes on as a fellow conspirator, one of the staphylococcus groups, and as it progresses local cavitation ensues.

The urinary secretion charged with these irritative bacterial agents produces secondary and highly characteristic changes along its entire trajectory; pyelitis—ureteritis —early uretero-vesical sphincteris hyperæmia and œdema, vesical ulceration, cystitis, vesical neck œdema, and in its terminal stages, urethral œdema.

Ureteral change is pronounced as renal tuberculosis progresses.

Oedema—hyperplasia—narrowed lumen—occasionally occlusion and tortuosity—all of which must of necessity embarrass its normal peristaltic action.

In its early stages the changes result from the irritative action of the tubercle bacillus, or by the products of its activity. These in the terminal stage are supplemented by the resultant mechanical factors previously mentioned.

In other words, renal tuberculosis in its early stage is characterized by trouble from above downward—in its later aspects, from below upward. It is altogether likely that when this disease extends cortically and assumes the clinical picture of perinephritic abscess, as it occasionally does, these mechanical factors play the important rôle. It is this phase of renal tuberculosis only that comes within the province of our subject.

The general symptoms are characteristic of renal tuberculosis.

Young subject, generally male—urinary frequency—urgency—dysuria—vesical intolerance—polyuria—hematuria—nocturia (this is especially significant).

The urine is light in color, highly acid—low specific gravity—always contains pus—almost always the tubercle bacillus.

Family and personal history and chest x-ray furnish the leads.

Palpation of affected side reveals moderate or acute tenderness and perhaps a tumefied kidney.

The temperature curve in this type of mixed infection (renal tuberculosis) is frequently characteristic. Marked elevation in the afternoon or early evening.

The patient is by no means as acutely ill as with a similar lesion resulting from a streptococcus infection. X-ray alone is at times helpful, at others of little assistance. This type of case has, on a number of occasions, given us the greatest difficulty in its diagnosis. Always there is much pus, occasionally no tubercle bacillus. At times it has been impossible to catheterize the ureter. To-day the diagnosis is utterly simple.

With such a clinical picture, the intravenous administration of uroselectan, followed by serial radiographic exposure, at once clarifies what heretofore has been perplexing.

It delineates the kidney outline and precisely indicates the degree of loss of function—at the same time tells us how well or otherwise the other kidney is performing its excretory duties.

Surgery is the sole recourse of the moment and to be effective must be radical. Prophylaxis and sustained observation should follow. In other words, that patient is a convalescent until every tuberculous focus near or remote has healed. Often a matter of years thereafter.

Septic Pyelonephritis. As differentiated from the tuberculous type will now be considered.

In the light of the many advances made in this subject both in diagnosis and treatment, present day text books are inadequate.

The kidney, ureter, bladder and urethra constitute the most elaborate filtration and transportation system in nature. Any interference, therefore, with the normal rhythm of this complex transportating mechanism, results in, as may readily be inferred, a wide variety of secondary change.

A case of phimosis, as will be shown you, has without other demonstrable cause resulted in complete destruction of the entire urinary system, terminating in death of this child.

Contracted urethral meatus, urethral stricture, congenital posterior urethral bands, impacted calculi, neurological lesions resulting in paralysis or atony of bladder muscle, vesical diverticulitis, prostatic hypertrophy, vesical growths, calculous disease, ureteral mouth obstruction or atony resulting in loss of contractile power, ureteral stricture, narrowing or angulation of its lumen from whatever cause, obstructing neoplasm, renal tubular or vascular

plugging, malposition of the kidney—these and other factors, many of which though comparatively insignificant in their onset, may in the course of time, result in lesions of considerable magnitude. As clinicians collaborate more and more, as they should but commonly do not, with pathologists, as they conjointly investigate the histopathological characteristics of kidney substance, a more accurate conception of minute structural change and a better comprehension of predisposing factors must of necessity eventuate.

The foregoing inventory prefaces the belief on the part of the author of this communication that obstruction plays the preponderating rôle in the production and the evolution of infectious pyelonephritis.

The elevation of critical eyebrows is not anticipated, until kidney substance is reached. But if the question is answered as to just why one kidney will filter pathogenic bacteria while its fellow of the opposite side arrests them or why a given kidney may successfully eliminate these bacteria at one time and later fail in such effort, and why it is so frequently unilateral, this speculative pronouncement will be withdrawn.

While tuberculosis of the kidney manifests its destructive and obstructive action from above downward, the reverse obtains in the causation of pyelonephritis.

Time will not permit the detailed consideration of symptomatology of the many aspects and stages of this lesion and because of their wide variation little is to be gained thereby.

Whereas much benefit may be had from a survey of methods of diagnosis and treatment. The patient comes to the urologist, as he or she should come, with a history of pain or discomfort in the region of one kidney, or intermittent attacks of reno-ureteral colic—which may or may not have had an acute onset, or the symptomatology may be negligible, and the patient referred because of considerable pus in the urine.

A preliminary x-ray generally may indicate an enlarged or occasionally its opposite, a hypoplastic kidney on one side.

In the hands of the expert the diagnosis is simplicity itself. Cystoscopic examination, urinary separation, chemical, microscopic and cutural investigation of the same. Renal colorimetric functional tests and ureteropyelographic and cystoscopic study, not only confirm or exclude the diagnosis, but what at times is of equal importance, they indicate whether conservative renal surgery is advisable and the kidney to be salvaged. Here again Uroselectan may be routinely employed. It certainly will indicate the functioning capacity of both kidneys and may delineate these organs in a highly satisfactory manner. It frequently fails in adequately outlining associated uretero-renal pelvic lesions.

At the moment it seems that this new and beneficent diagnostic agent plays its most effective rôle in acute renal infections and more especially in children.

Surgical treatment of pyelonephritis has made considerable progress, time may prove it to have progressed too far.

Until recently, generally speaking, to diagnose a case of pyelonephritis implied its removal, to-day it is probable the pendulum is swinging in the opposite direction too rapidly and too far. Right or wrong in this assumption we have to thank our European colleagues Von Lichtenberg of Berlin and Papin of Paris for their brilliant efforts in this field of conservation and for stressing what is undoubtedly true, that by adequate drainage and suspension in selected cases of pyelonephritis, many kidneys will be saved that, even at present, are routinely sacrificed.

Summary: Perinephritic abscess is a serious constitutional disease with dangerous local manifestations.

A history of remote infection though of mild and apparently local character, followed even for some considerable time thereafter by sharp pain in either kidney re-

gion, associated with pronounced temperature elevation, should at once place the lesion under suspicion. Be not misled by the absence of urinary signs.

Have early recourse to x-ray examination.

Practitioners are notably delinquent in availing themselves of this invaluable diagnostic step.

Urologists employ this method as frequently as they do the stethoscope, more frequently, I suspect.

Finally, remember the admonition about early hospitalization.

Pyelitis—here the history, symptomatology.

Constitutional signs and urinary findings, early point to the lesion.

Aside from the so-called elusive ulcer, vesical diverticulitis, neoplasm, calculous disease, the bladder may be dismissed from your mind as a factor in disease, its troubles come from below and are obstructive, or from above when they are irritative or neurological.

Culture early and often all such urines.

Culture also all obscure hematurias.

Do not overlook the possibilities in bacteriophage. When an active phage is found its administration may be productive of most gratifying results. It has salvaged at least one life since our investigation began.

Pyelitis is rarely cured by mouth medication or by expectancy.

Finally, cystoscopy is not a major surgical procedure.

Pyelonephritis: is notable for pronounced urinary manifestations. Diagnosis here, as in most urological disease is a technical procedure. Microscopical, chemical and cultural study of the urine and a radiographic examination is about all the practitioner can do for such a case. Prompt instrumental intervention and correction of ob-

structive conditions below the renal pelvis may save your patient an operation or early and conservative surgery, a kidney.

Foci of infection have an especial predilection for the urinary organs and if you would conserve your patient and deprive the urologist of the opportunity of making a livelihood, and a reputation, you will prevent or everlastingly pursue them.

The pendulum of public and professional opinion is either swinging to one extreme or the other. In the years past salicylates were given while the decayed tooth comfortably rested in its foul bed. Then came the stage when good and bad teeth were indiscriminately extracted, and salicylates withdrawn. The first implied ignorance, the second misguided enthusiasm.

When students such as Rosenow make the assertion that pulpless teeth even without demonstrable structure changes are at times a greater menace than those showing obvious destruction, and that it is not always possible to demonstrate infection in an infected tonsil and that in the presence of lesions such as pyelitis and pyelonephritis all such tonsils should be removed. This advice coming from such a source is deserving our most serious attention.

When these suspected foci are removed and the disease after reasonable time unimproved, resume your search.

Practitioners of medicine and specialists alike are either a menace or beneficent influence in the community in accordance with the conscientious care of their patients, which of necessity implies a life long pursuit of knowledge in their chosen field.

The foregoing commentaries are given with but moderate regard for precedent.

Fortunately there does not exist in medicine—in contradistinction to the law—that idolatrous worship of precedent.

BOOK REVIEWS

The Conway Letters *

Books giving patients' own accounts of their ailments, and of the doctors who treated them, are few in number and sometimes of considerable value, as affording sidelights on the state of medical practice in the period. One recalls Montaigne's Journey into Italy, Dr. Leonard Mark's Autobiography (acromegaly) or the volumes in which victims of the various neuropsychoses have described their symptoms and states of soul. The basic interest of the Conway Letters is that it outlines the pathography of a 17th Century lady of extraordinary strength of mind and will-power, whose whole adult existence was a prolonged endurance of pain, gallantly sustained, as if to the rhythmus of Emily Bronte's memorable lines—

> "The long war closing in defeat,
> Defeat serenely born."

Anne Finch (1631-78), later Viscountess Conway, was the sister of Sir John Finch, M.D., whose lifelong friendship with Sir Thomas Baines is the theme of a scholarly monograph by Dr. Archibald Malloch, a book inspired by Sir William Osler. Both brother and sister were vivid, exalted enthusiasts of "eager, anxious being," in close touch with the leading intellectuals of their time, Anne finding her balance-wheel in the Platonist poet, Henry More, John through the lucubrations of the stolid, withal sensible Baines. At the age of 12, Anne was ill with an indecipherable fever and sometime after her marriage with Edward Conway (February 11, 1651), she became afflicted with racking headaches, attributable perhaps to this infection, unyielding to the crude, folkloristic therapy of the time and persisting to the end of her life. Whether migraine or sinus trouble or cerebral lesion or eyestrain, by this incubus she was hag-ridden for over 30 years, yet a student of Cartesianism and the Cabala, a thinker of her own thoughts, endowed with religious feeling of a sublime

order and winding up her *Leben auf aufsteigender Linie* by going over to the despised sect of Quakers, to the dismay of More and the members of her family. If the oil painting of Van Hoogstraaten be a true limning, she was dark, handsome, distinguished, upstanding, the great lady of Mazarine type recessive to the pietist. The interest of her life history to the medical profession is that it confirms what is known of medical practice in the 17th Century all along the line. In the 17th Century, laboratory science went up; medical practice sank to a level not much better than that endured by primitive savages. As always happens, the doctors of the period had unlimited confidence in this combine of Galenicals and *Dreckapotheke,* in which even courtiers dabbled. Sydenham, outstanding as the greatest internist of the century, would not loom so large, had be been surrounded by Fothergills, Lettsoms and Cullens or by Bretonneaus, Chomels and Laennecs. Sir Kenelm Digby, with the best intentions, poisons his beautiful wife with viper wine and is never again quite the *bellimbusto* of his arrogant prime. The filth and rumblebumble in the London Pharmacopœia are not cast out until after the publication of Heberden's *Antitheriaca* (1718). Ridicule of the lengthy prescriptions made honors easy for Mark Twain ("serve with a shovel") and their ingredients, a pharmacopœia not unlike that of the Chinese hospital in Manila, may be seen, laid out on a table, in a Strassburg colored plate of 1744, which Wickersheimer has published. Poor Lady Conway tried plasters, embrocations, red lead powders, clysters, tobacco, coffee, Boyle's *ens veneris,* the device of water let fall upon the head, the manipulations of Greatrakes and (apparently) the Universal Specific ridiculed in Hudibras, and even sailed to France to essay trephining, but, fortunately for her, was fubbed off by the usual Parisian expedient of venesection. She was treated in succession by William Harvey, whose indifferent reputation at the bedside is confirmed in her letters, Turquet de Mayerne, Luke and Thomas Ridgely, Sir Francis Prujean, Thomas Willis, who published her clinical history, Robert Boyle, Valentine Greatrakes, and

not one of them accomplished anything. Greatrakes contrary to common tradition, appears as a sensible, modest, well-to-do man, who made little of his cures and admitted his failures. Comes, in the end, the younger van Helmont, son of the great medical mystic, who promises much but does nothing more than to steer his patient into Quakerism. On February 23, 1678, her married life mainly a retirement to the sick room, Anne Conway dies, "giving up her spirit without any perceptible motion and keeping a very sweet face." Her brother dies in 1682, having survived the faithful Baines little more than a year. Lord Conway, after sundry essays, remarries twice, becomes Secretary of State, is deposed, survives the humiliation a few months and, with his death, in 1683, his branch of the family becomes extinct.

The 17th Century, jocund in Rubens, Herrick and Pepys, serene and pensive in Spinoza, Molière, Shakespeare and the Platonists, passionate in Donne and Crashaw, mortuary in Bach, Bunyan, and Sir Thomas Browne, lives anew in these pages. The general tone of the Conway correspondence is mortuary, the quaint English is prolix and sometimes tedious. There is the most childlike credence in signs, portents, apparitions and witchcraft, while all and sundry discuss their ailments as never before, out of sympathy, let us hope, with the long-suffering patient. There are immense dull patches, suggesting Lowell's sarcasm about the 17th Century people, that "even their relaxations were such down-right hard work"; yet the book, as a whole, makes a transcript from life as realistic as Pepys or the closely woven fictions of John Galt. The anonymous letter to Lord Conway, describing the Great Fire of London, is probably the most dramatic account of that episode outside of Defoe; and the way in which More tiptoes out of his declaration of love, after Anne's rebuff, is very amusing. Professor Nicholson has done her work well, erring, if at all, through excess of sympathy with her subject. What might seem fine writing *à tout prix* is perceived to be harmonic and contrapuntal adaptation to the quaint *milieu* and diction, very much as viola

and clarinet chime together so effectively in Mozart's trio for the latter instrument. So, too, Emerson, a 17th Century spirit if there ever was one, prefaces his essay on the Oversoul with a verse of Henry More:

"When they shall die, then God himself shall die:
They live, they live, in blest eternity."

No one will ever understand the 17th Century (Osler's favorite period), who cannot appreciate the high-pitched exaltation of these oversouled people, from the martyrdom of Bruno (1600) to the abasement of Spinoza. The recent slating of Emerson, as a phase of the current device of high-hatting substantial people in order to boost yourself, is thus more a reflection upon his critics than upon Emerson himself. The present volume is very like Goethe's smpathetic account of the fair pietist in Wilhelm Meister. Anne Conway, who, as More says, "lived in the dark much," is very much alive in these pages, but her day is yet to come. Long after her death, her name was mentioned with profound veneration by Leibnitz himself. Like the heroine of the German tale, *Sie starb in der Dunkelheit, aber es wird einst tagen.*

F. H. GARRISON.

* Conway Letters. The Correspondence of Anne, Viscountess Conway, Henry More and their Friends, 1642-1648. Collected from Manuscript Sources and edited with a Bibliographical Account, by Marjorie Hope Nicholson. XXVII, 517 pp., 15pl. roy. 8, New Haven, Yale University Press, 1930. $6.00.

A NEW BILINGUAL OF FRACASTORIUS*

There are few of the greater physicians of the past who have had such good fortune with posterity as Fracastorius. Judging the man by the indifferent, meditative guise apparent in his portraits, his preference for a restful, retired life by the Lac du Garde, his garrulous, confiding literary manner, a veritable logorrhœa for a man otherwise taciturn, his way of getting wrapped up in a subject without regard to the reactions of his readers—all these traits betoken the careless, easy-going, good-natured being whose

inclination to "woo the strumpet Fame" was that of a sluggard, if not of a laggard. Everything about Fracastorius suggests the logical opposite of a go-getter. He has, if anything, a touch of the disinterested amiability, the indifferent ease and repose of Clelia Conti, the Duchesse de Sanseverino and the other Stendhal characters we like so well. Yet so solid is his essential performance that he eludes the common lot of Goldsmith's "Good-Natured Man," who equated "the vanity of our existence" with "the folly of our pursuits." His reputation increases apace across the centuries and to-day he stands among the "happy few" predestined apparently to win universal approbation without going after it with a crow-bar. It seems comical, for instance, that we should now call the "greater pox" (*lues venerea*) by a fanciful name which careless Fracastor distorted, by misspelling and false quantity, from Sipylus** son of Niobe, slain by Apollo. It is a delightful example of the luck of the easy-going. The poem in which the term is introduced (*Syphilis,* Verona, 1530) passed through 16 successive editions, published in 12 different European cities, the last being the piquant, vest-pocket, tercentenary reprint of Choulant (Leipsic, 1830). Of this poem, there were five separate translations into Italian, five into French, one into German and a rhymed English version (London, 1686), by Nahum Tate, who versified the Psalms, wrote many of the hymns still sung in church and succeeded Shadwell as poet-laureate in 1692. Fracastor's complete works (*Opera omnia,* Venice, Junta, 1555) passed through five subsequent editions in a century (1574-1671). Apart from the present version, his treatise on contagion (Venice, 1546) was translated into French by Alfred Fournier (1869) and Leon Meunier (1893), into German by Victor Fossel (1910), into English by W. R. Riddell (1928). F. O. Mencke, of the Menckenii, a relative of our well-known journalist, devoted immense labor to an authenticated biography of Fracastor (1731), who was introduced to the American profession by Osler (1906), while his iconography (statue, medallion, engravings) was investigated by Arnold Klebs (1915) and his present position in science by Charles Singer (1917). He was as-

suredly no ordinary man who could thus draw unto himself, across the ages, so many willing workers, eat his cake and have it, compass at once the name and the fame, as well as the game. Fracastorius (1478-1553) was, in fact, a highly esteemed practitioner of Verona, who named syphilis (1530), first described typhus fever (1546), botanized, played with astronomy and globe-making, was one of the earliest investigators of fossils and geological formations, and author of the first reasoned statement, albeit without laboratory proofs, of the bacterial theory of infection.

The bilingual edition of his *opus magnum* by Professor Wilmer Cave Wright, now before us, signalizes a new departure of the Academy, viz. the inception of a series of monographs bearing upon the History of Medicine. The beginning is auspicious, for bilinguals of important Latin medical texts, subsequent to those of classical antiquity and similar to the medical items already published in the Loeb Series, are likely to meet a long felt want. In the case of the present volume, which is incidentally the first systematic treatise on communicable diseases (epidemiology), the task has been very properly confided to a professional classical scholar. Professor Wright has improved vastly upon the Latin-French bilingual of the late Dr. Leon Meunier (1893), which was found to contain many faulty readings in its Latin text, with corresponding errors in the translation. The present revision was effected by collation of the texts of 1546, 1550, 1554 and 1555. The biographical introduction is a valuable piece of careful research work, new to most readers. The old date of birth of Fracastor (1483) is discarded in favor of that authenticated by Barbarini (1475), thus adding eight years to his life. A clear, understandable translation and 50 pages of very helpful notes and bibliography add to the creditable scholarship manifest in this volume. The text itself, antedating Baillou and Sydenham by a century or more, is the crude ore or raw material of epidemiology, veins and grains of gold imbedded in superabundant iron pyrites. To borrow an image of Emerson's, the thyme, marjoram and other flowers of Fracastor's fancy have not yet become the

merum mel of the busier bees of bacteriology. Fracastor regards contagion as synonymous with infection and defines it (p. 5) as "a certain passive affection of elements in combination" (i.e., a metabolic phenomenon), passing "from one thing to another and originally caused by infection of the imperceptible particles"—a dreadful *petitio principii*. His three ways of contagion—by direct contact, by fomites and by action at a distance—are, as Professor Wright points out, already embalmed in a Salernitan verse—

> "Seu potius morbi contagia tangere vitent
> Aegrum, aegrique halitus, velamina, lintea vestes,
> Ipseque quae tetigit pura corpora dextra,"

and knowledge of the contagious nature of phthisis, conjunctivitis ("evil eye") and scabies was as old as Aristotle (*Problemata,* VII, 8). It is in his view of the material agencies of infection that Fracastorius is original and stands quite apart. He saw them as *seminaria* or seeds of disease, capable of reproduction (*consimilia sibi alia generant*), of a viscous or glutinous nature (*lenta glutinosaque*), whereby they are tough and resistant, except to extreme heat or cold, and adapted, by their stickiness, to transmission by fomites. Before the advent of physical chemistry, substances of this sticky, glutinous nature occasioned in laboratories the "inspissated gloom" noted by the late Professor Remsen pending the analysis of a jelly, a glue or a gum. To-day, we call them colloidal systems, of which protoplasm is the most important and interesting. Fracastor's prevision of their ultimate nature turns upon his exquisite choice of the adjectives *lenta, glutinosa*—a good guess, if there ever was one. The rest of this important translation—the chapters on fevers, smallpox, measles, sweating sickness, typhus (*lenticulæ*), rabies, syphilis, elephantiasis, leprosy, scabies and skin diseases—is historically interesting by reason of the free play of critical intelligence apparent throughout the verbose exposition. Fracastorius ridicules Montanus' view of pestilent fevers as "a degree of greater putrefaction of the heart,"

and also the theory of American origin of syphilis, since the disease had become spontaneously prevalent all over Europe about 1490-92 and had existed long before, as evidenced by very old mercurial prescriptions.

The charm of Fracastorius may be sensed from his statement on retiring from practice—"There are now few, thank God, who recognize me as a physician"—or from such a dietetic interdiction as the following, from Tate's translation of his poem on syphilis—

> "Forbear the drake, and leave Rome's ancient friend
> The citadel and capitol to defend."

We may be sure that he laughed in his sleeves when Cardinal Bembo (a kindred spirit) likened him to Lucretius and Virgil. In this regard, he resembles Welch, who, with beautiful modesty, sees birthday honors unparalleled in the whole history of medicine as not attaching to himself but as a spontaneous tribute to the profession he represents. Such men are incapable of the "wounded vanity" which Nietzsche regards as "the mother of all tragedies." In registering our mite of appreciation of these unpretentious savants, all feel them to be above the "habit of self-reference which accompanies great, and even small reputations."

F. H. GARRISON.

* Hieronymi Fracastorii de contagione et contagiosis morbis et eorum curatione, libri III. Translation and notes by Wilmer Cave Wright, Ph.D. (History of Medicine Series, Library New York Academy of Medicine, No. (II) LVIII (3e), 356 pp. 80. New York, G. Putman's Sons, 1930.

** According to Franz Boll, proponent of this derivation, the variants "Siphylus" and "Syphilus" occur in extant MSS. of Ovid and Propertius.

RECENT ACCESSIONS TO THE LIBRARY

Adler, A. Die Technik der Individualpsychologie.
München, Bergmann, 1930, tl. 2.

Arey, L. B. Developmental anatomy. 2. ed.
Phil., Saunders, 1930, 563 p.

Baker, D. M. & Conkling, H. Water supply and utilization.
N. Y., Wiley, 1930, 495 p.

Barker, L. F. The relations of psychology to medicine.
Lawrence, Univ. of Kansas, 1930, 68 p.

Barkman, A. Études cliniques sur les syndromes moteurs et réflexes de la paroi abdominale et d'origine cérébrale.
Uppsala, Almqvist, 1929, 303 p.

Basler, A. Das Gehen und seine Veraenderung durch verschiedene Umstaende.
Canton: Verl. der Sun Yatsen Univ., 1929, 272 p.

Bilancioni, G. Sulle rive del Lete. Rievocazioni e ricorsi del pensiero scientifico italiano.
Roma, G. Bardi, 1930, 346 p.

Bonnamour, S.; Badolle, A. & Gaillard, R. Le radio-diagnostic dans les affections broncho-pulmonaires par le lipiodol.
Paris, L'Expansion scient. française, 1929, 109 p.

Bonnier, P. L'action directe sur les centres nerveux; centrothérapie. Nouv. éd.
Paris, Alcan, 1929, 304 p.

Cabot, R. C. Physical diagnosis. 10. ed.
N. Y., Wood, 1930, 529 p.

Camis, M. The physiology of the vestibular apparatus.
Oxford, Clarendon, 1930, 310 p.

de Giaxa, V. Igiene delle città.
Torino, Unione Tip. Editrice. Torinese, 1930, 398 p.

Hare, H. A. A text-book of practical therapeutics. 21. ed.
Phil., Lea, 1930, 1104 p.

Harrop, G. A., jr. Diet in disease.
Phil., Blakiston, [1930], 404 p.

Hartridge, H. & Haynes, F. Histology for medical students.
London, Milford, 1930, 369 p.

Herbst, E. & Apffelstaedt, M. Malformations of the jaws and teeth.
London, Milford, 1930, 320 p.

Hickman, C. P. Laboratory manual in college physiology.
N. Y., Macmillan, 1930, 116 p.

Kober, G. M. Reminiscences.
Wash., Kober Found. of Georgetown Univ., 1930, v.l.

Kopaczewski, W. Traité de biocolloïdologie. 2. éd.
Paris, Gauthier-Villars, 1930, v.l.

Koristka, C. Il microscopio.
Milano, Hoepli, 1930, 392 p.

Kromayer, E. The cosmetic treatment of skin complaints.
London, Milford, 1930, 110 p.

Lehmann, W. Grundzüge der Neurochirurgie.
Dresden, Steinkopff, 1930, 197 p.

Leroy, R. & Médakovitch, G. Paralysie générale et malariathérapie.
Paris, Doin, 1931 [1930], 480 p.

Levine, M. & Schoenlein, H. W. A compilation of culture media.
Balt., Williams, 1930, 969 p.

Mathews, A. P. Physiological chemistry. 5. ed.
N. Y., Wood, 1930, 1233 p.

May, C. H. Manual of the diseases of the eye. 13. ed.
N. Y., Wood, 1930, 461 p.

Nichols, I. G. Prosthetic dentistry.
St. Louis, Mosby, 1930, 687 p.

Nicholson, D. Laboratory medicine.
Phil., Lea, 1930, 433 p.

Oddo, B. Chimica farmaceutica e tossicologica.
Milano, Vallardi, 1930, 2 v.

Peabody, F. W. Doctor and patient.
N. Y., Macmillan, 1930, 95 p.

Rand, E.; Sweeny, M. E. & Vincent, E. L. Growth and development of the young child.
Phil., Saunders, 1930, 394 p.

Reed, A. C. Tropical medicine in the United States.
Phil., Lippincott, [1930], 410 p.

Sanfelice, F. Etiologia e cura dei tumori maligni.
Napoli, Idelson, 1930, 139 p.

Schlesinger, H. Klinik und Therapie der Alterskrankheiten.
Leipzig, Thieme, 1930, 132 p.

Sergent, Edm.; Sergent, Ét. & Parrot, L. La decouverte de Laveran.
Paris, Masson, 1929, 48 p.

Söderbaum, H. G. Jac. Berzelius: Levnadsteckning.
Uppsala, Almqvist, 1929, 2 v.

Soerensen, J. Die Mund-und Halsoperationen.
Berlin, Urban, 1930, 457 p.

Sonntag, E. & Rosenthal, W. Lehrbuch der Mund-und Kieferchirurgie.
Leipzig, Thieme, 1930, 444 p.

Text-book (A) of pathology. Edited by E. T. Bell.
Phil., Lea, 1930, 627 p.

Thaysen, A. C. & Galloway, L. D. The microbiology of starch and sugars.
London, Milford, 1930, 336 p.

Thomas, S. Bacteriology; a text-book on fundamentals. 2. ed.
N. Y., McGraw-Hill, 1930, 301 p.

Todd, T. W. Behavior patterns of the alimentary tract.
Balt., Williams, 1930, 79 p.

Uhlmann, E. Indikationen und Methodik der Strahlenbehandlung bei Hautkrankheiten.
Berlin, Stilke, 1930, 130 p.

Wieman, H. L. An introduction to vertebrate embryology.
N. Y., McGraw-Hill, 1930, 411 p.

PROCEEDINGS OF ACADEMY MEETINGS

NOVEMBER

Stated Meetings

Thursday Evening, November 6

ORDER

I. Executive Session at 8:30 o'clock

a. Report of the Nominating Committee

Nominations for President for two years, for one Vice-President for three years; for Recording Secretary for three years; for two Trustees for five years; for one member of the Library Committee for five years; and for four members of the Committee on Admission for three years

b. Election of Fellows

II. The Anniversary Discourse at 8:45 o'clock

"The preface to morals," Frederick J. E. Woodbridge, Professor of Philosophy, Columbia University

Thursday Evening, November 20, at 8:30 o'clock

The Second Harvey Lecture

"Mass Action and Localization of Functions in the Cerebral Cortex," K. S. Lashley, University of Chicago

Alfred E. Cohn, President Harvey Society

Dayton J. Edwards, Secretary Harvey Society

This lecture takes the place of the second Stated Meeting of the Academy for November.

Section of Dermatology and Syphilology

Wednesday Evening, November 5, at 8:30 o'clock

(Please note change in date)

ORDER

I. Reading of the Minutes

II. Presentation of Cases

a. Cases from New York Post Graduate Hospital

b. Miscellaneous cases

III. General Discussion

IV. Executive Session

Examination of cases is limited to members and their invited guests

Section of Surgery

Friday Evening, November 7, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Presentation of Cases

Cases illustrating the paper of the evening, Alice R. Bernheim, Herbert W. Meyer, David C. Bull, Isidor S. Tunick (by invitation)

III. Paper of the Evening

Thrombo-angiitis obliterans, George E. Brown, Mayo Clinic (by invitation)

IV. Discussion

Harry Finkelstein and those presenting cases

Section of Neurology and Psychiatry

Joint Meeting

with the

New York Neurological Society

Tuesday Evening, November 11, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Clinical Presentations

(from the neurological service of the Mount Sinai Hospital)

a. Gliosis of the brain stem

b. Ophthalmoplegia with remissions

c. Interpeduncular tumor; deep X-ray therapy; improvement

d. Acute luetic meningitis with recovery, Israel Strauss

e. Metastatic brain abscess, operation, recovery, Ira Cohen

III. Neuropathological Demonstration

Origin of amyloid bodies, A. Ferraro and L. A. Damon (by invitation)

IV. Paper of the Evening

Problems in the development of the nervous system, S. R. Detwiler, Professor of Anatomy, Columbia University (by invitation)

Discussion, H. D. Senior, Professor of Anatomy, New York University

V. General Discussion

VI. Executive Session

Section of Historical and Cultural Medicine

Wednesday Evening, November 12, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Papers of the Evening

a. Reminiscences of Doctor S. Weir Mitchell, Irving Wilson Voorhees

b. Birth of laryngology, D. Bryson Delavan

c. Anatomic traditions and the old Italian universities, James V. Ricci (by invitation)

III. General Discussion

IV. Executive Session

Section of Pediatrics

Thursday Evening, November 13, at 8:30 o'clock

ORDER

I. Papers of the Evening

a. Physical therapy in pediatrics, Richard Kovacs

Discussion, Kristian Gosta Hansson (by invitation)

b. The value of digitalis in children with rheumatic heart disease, Lucy Porter Sutton

Discussion, John Wyckoff, Harry Gold

c. Some lesions found in the heart in rheumatic fever, Louis Gross
Discussion, Homer F. Swift

II. General Discussion

Section of Otology

Friday Evening, November 14, at 8:30 o'clock

ORDER

I. Reading of the Minutes
II. Presentation of Cases
III. Papers of the Evening
a. Nature of stimulation at the organ of Corti in the light of modern physical experimental data, Mr. R. L. Wegel, Bell Telephone Laboratories (by invitation)
b. Auditory nerve responses in animals and their relation to hearing, E. G. Wever, Ph.D., Princeton University (by invitation)
Discussion, H. F. Fletcher, Ph.D., Bell Telephone Laboratories (by invitation), C. W. Bray, Ph.D., Princeton University (by invitation), H. B. Williams, Columbia University
IV. General Discussion
V. Executive Session

Section of Ophthalmology

Monday Evening, November 17, at 8:30 o'clock

ORDER

I. Reading of the Minutes
II. Presentation of Cases
a. Melanotic naevus of the eye, Guernsey Frey
b. Melanotic naevus of the eye (recurrent), James W. Smith
c. An unusual case of medullated nerve fibers with amblyopia, S. A. Agatston
III. Demonstration
A blood aspiration canula for lacrimal sac surgery, Daniel B. Kirby
IV. Papers of the Evening
a. The ocular pathology of Niemann-Pick's Disease with cherry-red spots in the macula. (lantern slides), David Wexler (by invitation), Isidore Goldstein
Discussion, Bernard Sachs
b. Social service at the Massachusetts Eye and Ear Infirmary, George S. Derby, Boston (by invitation)
Discussion, Miss Amy Smith, Massachusetts Eye and Ear Infirmary (by invitation), John M. Wheeler, Conrad Berens, Isaac Hartshorne
V. General Discussion
VI. Executive Session

Section of Medicine

Tuesday Evening, November 18, at 8:30 o'clock

ORDER

I. Papers of the Evening
   a. The etiology of rheumatoid arthritis and its bearing on treatment, Russell L. Cecil
   b. The differential diagnosis of rheumatoid and osteo-arthritis, Martin H. Dawson (by invitation)
   c. The function of the orthopedic surgeon in the control of chronic arthritis, Robert B. Osgood, Boston (by invitation)

II. Discussion
   Ralph H. Boots, Malcolm Goodridge, Earl E. Van Derwerker

Section of Genito-Urinary Surgery

Wednesday Evening, November 19, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Presentation of Cases
   Illustrative cases of teratoma testis treated by radiation, Archie L. Dean, Jr.

III. Paper of the Evening
   Tumors of the testis, brief series with review of literature, David W. MacKenzie, Max Ratner, McGill University Medical School (by invitation)
   Discussion, Benjamin S. Barringer, Archie L. Dean, Jr., Joseph F. McCarthy, Alfred T. Osgood

IV. General Discussion

V. Executive Session

Section of Orthopedic Surgery

Friday Evening, November 21, at 8:30 o'clock

ORDER

I. Reading of the Minutes

II. Presentation of Cases
   a. Fracture of the cervical spine, Mather Cleveland
   b. Report of three cases of fracture of the spine, Isaac Reitzfeld (by invitation)
   c. Report of case of fracture of the spine, Samuel W. Boorstein

III. Papers of the Evening
   a. Treatment of compression fractures of the spine, Arthur G. Davis, Erie, Pa. (by invitation)
   b. Treatment of compression fracture of vertebral bodies by gradual hyperextension and early mobilization, William A. Rogers, Boston (by invitation)
   c. Fractures of the spine treated by fusion, with report of three cases, Walker E. Swift

SECTION OF LARYNGOLOGY AND RHINOLOGY
Coordinated Afternoon Clinic at the
MANHATTAN EYE, EAR AND THROAT HOSPITAL
210 East 64 Street
Friday, November 21, at 2:00 o'clock

ORDER

I. PRESENTATION OF CASES
   a. Rhinological and laryngological cases from the services of E. Ross Faulkner, John E. Mackenty, Harmon Smith, Francis W. White
   b. Bronchoscopic cases from the service of C. J. Imperatori
   c. Radium cases, G. Allen Robinson
II. OPERATIONS BY STAFF MEMBERS
III. DEMONSTRATIONS
   a. Pathological specimens, A. A. Eggston
   b. Roentgenological, Frederick M. Law
   c. Intra-tracheal anesthesia, P. J. Flagg

Friday Evening, November 21, at 8:30 o'clock
(Please note change in date)
THE NEW YORK ACADEMY OF MEDICINE

ORDER

I. READING OF MINUTES
II. PAPERS OF THE EVENING
   a. Pitfalls in local tonsillectomy, Harry Neivert (by invitation)
   b. Management of nasal fractures, Francis W. White
   c. Management of chronic tube cases, Arthur S. Wilson
III. ROUND TABLE CONFERENCE
   Subject "Diet in Sinusitis"
   Abstract of recent literature, Thomas J. Harris
   Discussion on
      1. Rhinological aspect, Lewis A. Coffin
      2. Dietetic aspect, Adolph G. DeSanctis
IV. GENERAL DISCUSSION
V. EXECUTIVE SESSION

SECTION OF OBSTETRICS AND GYNECOLOGY
Tuesday Evening, November 25, at 8:30 o'clock

ORDER

I. READING OF THE MINUTES
II. PRESENTATION OF CASES
   a. Hemorrhage from a ruptured varicosity in the placenta causing the death of the fetus
   b. Rigor mortis of fetus causing difficulty in delivery, Morris Leff
   Discussion, Harbeck Halsted

III. Papers of the Evening
  a. Prolapsed umbilical cord. Analysis of one-hundred cases, Julius Kurzrock
  Discussion, Frederick A. Kassebohm (by invitation), Edwin G. Langrock
  b. Spinal pelvic relationship, a guide in the consideration of uterine position, Maurice O. Magid
  Discussion, Arnold Sturmdorf, Armitage Whitman
IV. General Discussion
V. Executive Session

New York Roentgen Society
In affiliation with
The New York Academy of Medicine
Monday Evening, November 17

ORDER

I. 8:30 p.m. to 9:00 p.m.
  Demonstration of interesting cases and roentgenograms
II. 9:00 p.m.
  Silver as a filter in high voltage roentgen therapy, Maurice Lenz
  9:05 p.m.—Difficulties in differential diagnosis of bone tumors, Raymond Lewis
  9:20 p.m.—Endothelial myeloma or Ewing's tumor, George T. Pack
  9:35 p.m.—Intermediate changes and end results in the roentgen ray treatment of bone tumors, Ralph E. Herendeen
  Discussion, James Ewing, Frank Adair
III. Executive Session
Ross Golden, President
J. Bennett Edwards, Secretary

New York Meeting
of the
Society for Experimental Biology and Medicine
under the auspices of
The New York Academy of Medicine
Wednesday Evening, November 19, at 8:15 o'clock

I. The pharmacology of inflammation. Technic, L. Hirschhorn, M. G. Mulinos
II. Protein sulfhydryl groups, A. E. Mirsky, M. L. Anson
III. Experimental studies of amyloidosis, H. G. Grayzel, M. Jacobi, H. Maslow, H. B. Warshall (Introduced by B. Kramer)
IV. Determination of serum protein, E. H. Fishberg, B. T. Dolin
V. Influence of an extensive meat diet on human intestinal flora, J. C. Torrey
VI. Influence of age on the effect of parathormone on guinea pig bones, H. L. Jaffe, A. Bodansky and J. E. Blair

VII. Studies on the concentration of the causative agent in the Rous chicken sarcoma No. 1, M. J. Sittenfield, B. A. Johnson

VIII. Attempts at chemotherapy in experimental poliomyelitis, C. W. Jungeblut

IX. Effect on costal respiratory movements of division of the phrenics following transection of the midbrain, H. C. Coombs

PEYTON ROUS, President

A. J. GOLDFARB, Secretary

NEW YORK PATHOLOGICAL SOCIETY

In affiliation with

THE NEW YORK ACADEMY OF MEDICINE

Wednesday Evening, November 19, at 8:30 o'clock

(Please note change in date)

ORDER

I. PAPERS OF THE EVENING

a. Hemorrhage into pericardium following rupture of a coronary artery, Charles T. Olcott

b. Generalized amyloidosis: report of a case, Duncan McCuaig (by invitation)

c. The pathogenesis of hypernephroma, David Perla, J. Gottesman

d. The pathological and physiological aspects of simple goitre as produced experimentally in rabbits, Bruce Webster (by invitation)

e. Lipoid nephrosis, Paul Klemperer (by invitation), A. R. Kantrowitz

II. GENERAL DISCUSSION

III. READING OF THE MINUTES

LEILA CHARLTON KNOX, President St. Luke's Hospital

BERYL H. PAIGE, Secretary The Babies' Hospital

FELLOWS ELECTED DECEMBER 18, 1930

Philip George Crosbie Bishop.....14 East 75th Street
Herman L. Frosch.....1985 Bryant Avenue
John Giblin.....2 East 54th Street
Jacob Joshua Golub.....1235 Park Avenue
Helen Harrington.....104 East 40th Street
Leslie A. Homrich.....39 Fifth Avenue
M. Newton Jasper.....48 East 61st Street
Morris A. Lyons.....269 Lexington Avenue
Joseph L. Morse.....200 West 59th Street
Dudley J. Morton.....21 Claremont Avenue
Florence R. Sabin .....Rockefeller Institute
Edward W. Saunders.....103 East 78th Street

DEATHS OF FELLOWS OF THE ACADEMY

Sarah Browne Belcher-Hardy, M.D., 419 West 118 Street, New York; graduated in medicine from Woman's Medical College of New York Infirmary, New York City, in 1891; elected a Fellow of the Academy April 1, 1897; died, December 15, 1930. Dr. Belcher-Hardy served with the Rockefeller Institute, New York City, and was best known there for her work in connection with the regulation of New York City's milk supply, for which Rockefeller set aside a sum in the early part of this century.

Frederic Grosvenor Goodridge, M.D., Pomfret Center, Connecticut; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1901; elected a Fellow of the Academy May 7, 1908; died, December 17, 1930. Although a physician, Dr. Goodridge was retired from active practice.

Benjamin Van Doren Hedges, M.D., 1225 Watchung Avenue, Plainfield, N. J.; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1891; elected a Fellow of the Academy January 6, 1897; died, December 2, 1930. Dr. Hedges was a Fellow of the American College of Surgeons and the American Medical Association. He was a member of the New Jersey State Medical Society, Consulting Surgeon to Muhlenberg Hospital, Plainfield, and Bonnie Burns Sanitarium of Union County, former President of the Society of Surgeons of New Jersey and the New Jersey State Pediatric Society.

Ernest Ellsworth Smith, M.D., 50 East 41 Street, New York; graduated in medicine from the Bellevue Hospital Medical College, New York City, in 1898; elected a Fellow of the Academy March 6, 1902; died, December 5, 1930. Dr. Smith was a fellow of the American Medical Association, a member of the Pathological Society and Consulting Pathologist to Somerset and Jamaica Hospitals.

INDEX, 1930

AUTHORS

A

Adson, A. W., The surgical indications for sympathetic ganglionectomy and trunk resection in the treatment of diseases resulting from vasomotor spasm of peripheral arteries, 17
Annan, Miss G. L., Among our manuscripts, 56
——, ——, Among our manuscripts, Old remedies for old grieves, 698
——, ——, Winthrop books in the Academy Library, 695

B

Beekman, Fenwick, Acute hematogenous osteomyelitis, 792
Billings, Frank, Focal infection as the cause of general disease, 759

C

Camac, C. N. B., Remarks made at dinner given in honor of Dr. William H. Welch on April 4, 1930, 477
Casamajor, Louis, The psychoneuroses, 306
Coca, A. F., Specific sensitiveness as a cause of symptoms in disease, 593
Cole, Rufus, Remarks made at dinner given in honor of Dr. William H. Welch, on April 4, 1930, 488
Corwin, E. H. L., Report on the spas of Europe, 553
Crohn, B. B., The psychoneuroses affecting the gastro-intestinal tract, 155

D

Doe, Miss Janet, Academy Library activities of benefit to the medical library world in general, 742

E

Eggers, Carl, On the training of specialists, 509
Ewing, James, Remarks made at dinner given in honor of Dr. William H. Welch on April 4, 1930, 483

G

Garrison, F. H., Conway letters, The, 825
——, ——, Greek pediatrics, 630
——, ——, In memoriam, Walter M. Brickner, 755
——, ——, Medical tour in Europe, A (editorial), 243
——, ——, Medicine in Massachusetts, 734
——, ——, Modern dance of death, The, 630
——, ——, New bilingual of Fracastorius, A, 828
——, ——, New reading of Haller, A, 504
——, ——, Newer sidelights on the antiquity and provenance of Indian medicine (editorial), 523

——, ——, Progress in the cataloguing of medical incunabula (editorial), 365
——, ——, Reproduction of Hirsch and Pagel, A, 189
——, ——, Sir Humphrey Rolleston's life of Allbutt, 132
Gerster, J. C. A., On the training of specialists, 509
Goheen, R. H. H., Discussion, medicine in India, 127

H

Halsey, R. H., The cardiac neuroses, 89
Hartwell, J. A., Introduction, Catalogue of fourth annual exhibition of works in the plastic and graphic arts by American physicians, 201
Hume, E. H., Discussion, medicine in India, 125
——, ——, On the training of specialists, 509

K

Kennedy, Foster, Neuroses following accident, 1

L

Lambert, Alexander, Drug addiction, 605
Lambert, S. W., Remarks made at dinner given in honor of Dr. William H. Welch on April 4, 1930, 473
L. F., Two gifts to the rare book room, 278
Lichtwitz, Prof. L., General survey of visceral neuroses, 314
Logie, H. B., Suggestions for a national nomenclature of diseases, 668

M

McCarthy, J. F., Acute infections of the urinary tract, 808
——, ——, On the training of specialists, 509
McCullagh, Samuel, On the training of specialists, 509
McGraw, R. B., Postoperative emotional disorders; their prevention and management, 179
Malloch, Archibald, Appointment of Mr. L. L. Mackall as consultant in bibliography, 517
——, ——, Dr. Manges's gifts to the Academy, First radium for treatment in this country, 739
——, ——, Eighteenth century microscope given by Dr. Coleman, An, 740
——, ——, History repeats itself, 274
Martin, C. F., Medical education and medical practice, 774
Mathews, F. S., John of Arderne, 461

O

Osnato, Michael, Epidemic encephalitis, 136

P

Packard, F. R., William and John Hunter, A study in contrasts, 664
Peterson, Frederick, Obituary of Charles Edwin Atwood, 220
Pototzky, Carl, Insomnia and disturbances of sleep, 330

R

Reynolds, F. P., Opportunities which New York City offers for post-graduate medical study, 265
Riesman, David, The nonvalvular diseases of the heart in middle life, 536
R. L. D., Collection of lantern slides, 275
Rothschild, M. A., Neurocirculatory asthenia, 223
Ruggles, A. H., Psychiatry's part in preventive medicine, 453

S

Smith, Theobald, Remarks made at dinner given in honor of Dr. William H. Welch on April 4, 1930, 474
Stillman, Edgar, On the training of specialists, 509

T

Thomson, E. S., The eye in relation to general medicine, 577
Tilney, Frederick, Headache and migraine, 69
Timme, Walter, Endocrines and the vegetative nervous system, 33

V

Vail, C. E., Discussion, medicine in India, 130

W

Wanless, Sir W. J., Medicine in India, 105
Ward, G. G., On the training of specialists, 509
Watson, B. P., Can our methods of obstetric practice be improved?, 647
Welch, W. H., Remarks made at dinner given in honor of Dr. William H. Welch on April 4, 1930, 494
White, W. A., Psychotherapy, 287

Z

Zinsser, Hans, Immunity—general and local, The Wesley M. Carpenter Lecture, 709

SUBJECTS

A

Academy Library activities of benefit to the medical library world in general, Miss Janet Doe, 742
Academy medal, Award of, 142
Academy meetings, Proceedings of, 59, 145, 213, 280, 357, 443, 749, 836
Accessions to the Library, Recent, 51, 142, 210, 276, 354, 437, 518, 571, 642, 702, 745, 833
Accident, Neuroses following, Foster Kennedy, 1
Activities of benefit to the medical library world in general, Academy Library, Miss Janet Doe, 742
Acute hematogenous osteomyelitis, Fenwick Beekman, 792
Acute infections of the urinary tract, J. F. McCarthy, 808
Addiction, Drug, Alexander Lambert, 605
Afternoon Lectures, Academy announces a fifth series of lectures, The, 637
——, ——, Can our methods of obstetric practice be improved?, B. P. Watson, 647
——, ——, Drug addiction, Alexander Lambert, 605
——, ——. Eye in relation to general medicine, The, E. S. Thomson, 577
——, ——, Nonvalvular diseases of the heart in middle life, The, David Riesman, 536
——, ——, Psychiatry's part in preventive medicine, A. H. Ruggles, 453
——, ——, Specific sensitiveness as a cause of symptoms in disease, A. F. Coca, 593

Allbutt, Sir Humphrey Rolleston's life of, F. H. Garrison, 132
American German medical exchange opportunities, 436
Antiquity and provenance of Indian medicine, Newer sidelights on the (editorial), 523
Appointment of Mr. L. L. Mackall as consultant in bibliography, Archibald Malloch, 517
Arteries, The surgical indications for sympathetic ganglionectomy and trunk resection in the treatment of diseases resulting from vasomotor spasm of peripheral, A. W. Adson, 17
Arts by American physicians, Catalogue of fourth annual exhibition of works in the plastic and graphic, 201
Asthenia, Neurocirculatory, M. A. Rothschild, 223
Atwood, Charles Edwin, Obituary of, Frederick Peterson, 220
Award of Academy medal, 142

B

Bequest declined, A, 65
Bibliography, Appointment of Mr. L. L. Mackall as consultant in, Archibald Malloch, 517
Blood transfusion betterment association, 682
Book Review, Conway letters, The, F. H. Garrison, 825
—— ——, Epidemic encephalitis, Michael Osnato, 136
—— ——, Greek pediatrics, F. H. Garrison, 630
—— ——, Medicine in Massachusetts, F. H. Garrison, 734
—— ——, Modern dance of death, The, F. H. Garrison, 630
—— ——, New bilingual of Fracastorius, A, F. H. Garrison, 828
—— ——, New reading of Haller, A, F. H. Garrison, 504
—— ——, Reproduction of Hirsch and Pagel, A, F. H. Garrison, 189
—— ——, Sir Humphrey Rolleston's life of Allbutt, F. H. Garrison, 132
Books in the Academy Library, Winthrop, Miss G. L. Annan, 695
Books, Resolution passed by the Council on the 22nd of January concerning the clause in the tariff relating to obscene, 192
Brickner, Walter M., In memoriam, F. H. Garrison, 755

C

Cardiac neuroses, The, R. H. Halsey, 89
Carpenter lecture, The Wesley M., Immunity—general and local, Hans Zinsser, 709
Catalogue of fourth annual exhibition of works in the plastic and graphic arts by American physicians, 201
Cataloguing of medical incunabula, Progress in the (editorial), F. H. Garrison, 365
Coleman, An eighteenth century microscope given by Dr., Archibald Malloch, 740
Committee on Medical Education, 694
—— — —— —— , Recent publications of the, 354
Consultant in bibliography, Appointment of Mr. L. L. Mackall, Archibald Malloch, 517
Contrasts, A study in, William and John Hunter, F. R. Packard, 664
Conway letters, The, F. H. Garrison, 825
Correction, 218, 363, 575
Council accepts scholarship, 515
Council May 28, 1930, Resolution passed at meeting of, 513
Council on the 22nd of January concerning the clause in the tariff relating to obscene books, Resolution passed by the, 192

D

Dance of death, The modern, F. H. Garrison, 630
Death, The modern dance of, F. H. Garrison, 630
Deaths of Fellows of the Academy, 66, 154, 219, 286, 363, 451, 521, 575, 645, 708, 758, 843
Atwood, Charles Edwin, 219
Barnert, Cyril, 66
Belcher-Hardy, Sarah Browne, 843
Brickner, Walter M., 575
Burnham, Athel Campbell, 154
Campbell, Archibald M., 645
Clemens, James Brentano, 451
Cutler, Condict Walker, 575
Danziger, Ernst, 66
Davis, Asa Barnes, 645
Delatour, H. Beekman, 645
Dickinson, Gordon Kimball, 521
Farr, Edgar Horace, 451
Freudenthal, Wolff, 451
Fried, Gustav Adolph, 286
Fuller, Eugene, 451
Goodridge, Frederic Grosvenor, 843
Gordinier, Hermon Camp, 758
Haviland Clarence Floyd, 66
Hedges, Benjamin Van Doren, 843
Hoagland, Bonnette Wight, 363
Hollister, Frank Canfield, 66
Kaempfer, Louis Gabriel, 219
Lambert, Walter Eyre, 576
Lewson, Maximilian, 219
McCafferty, Lawrence Kinsman, 154
Mosler, Fred Henry, 154
Norton, Elliott, 66
Olds, Frank Williams, 219
Packer, Flavius, 451
Parker, Jason Samuel, 452
Partridge, Edward Lasell, 452
Seabrook, Harry H., 363
Shultz, Peter David, 286
Smith, Ernest Ellsworth, 843
Stephenson, Junius Winfield, 286
Stillwell, John Edwin, 708
Stimson, Charles Woodbury, 154
Walter, Milton Raphael, 286
Waterman, James Sears, 154
Weiss, Ludwig, 219
Wilson, John Eastman, 67
Declined, A bequest, 65
Discussion, Medicine in India, E. H. Hume, 125, R. H. H. Goheen, 127, C. E. Vail, 130
Disease, Focal infection as the cause of general, Frank Billings, 759
Disease, Specific sensitiveness as a cause of symptoms in, A. F. Coca, 593
Diseases of the heart in middle life, The nonvalvular, David Riesman, 536
Diseases, Suggestions for a national nomenclature of, H. B. Logie, 668
Disorders: their prevention and management, Postoperative emotional, R. B. McGraw, 179
Drug addiction, Alexander Lambert, 605

E

Editorial, Medical tour in Europe, A, F. H. Garrison, 243
——, Newer sidelights on the antiquity and provenance of Indian medicine, F. H. Garrison, 523
——, Progress in the cataloguing of medical incunabula, F. H. Garrison, 365
Education and medical practice, Medical, C. F. Martin, 774
Eighteenth century microscope given by Dr. Coleman, An, Archibald Malloch, 740
Election of Fellows, 64, 152, 218, 286, 363, 754, 843
Election of officers, 152
Emotional disorders: their prevention and management, Postoperative, R. B McGraw, 179
Encephalitis, Epidemic, Michael Osnato, 136
Endocrines and the vegetative nervous system, Walter Timme, 33
Europe, A medical tour in (editorial), F. H. Garrison, 243
Europe, Report on the spas of, E. H. L. Corwin, 553
Exchange opportunities, American German medical, 436
Exhibit, scientific, 736

Exhibition of works in the plastic and graphic arts by American physicians, Catalogue of fourth annual, 201
Eye in relation to general medicine, The, E. S. Thomson, 577

F

Fellows, Election of, 64, 152, 218, 286, 363, 754, 843
Focal infection as the cause of general disease, Frank Billings, 759
Fortnight, Annual Graduate, 1929 and 1930, see Graduate Fortnight
Fracastorius, A new bilingual of, F. H. Garrison, 828
Friday afternoon lecture series, see Afternoon lectures
Fund, The Edward N. Gibbs memorial prize, 273

G

Ganglionectomy and trunk resection in the treatment of diseases resulting from vasomotor spasm of peripheral arteries, The surgical indications for sympathetic, A. W. Adson, 17
Gastro-intestinal tract, The psychoneuroses affecting the, B. B. Crohn, 155
German medical exchange opportunities, American, 436
Gibbs memorial prize fund, The Edward N., 273
Gifts to the Academy, Dr. Manges's, First radium for treatment in this country, Archibald Malloch, 739
Gifts to the Academy, Recent, 514
Gifts to the rare book room, Two, L. F., 278
Graduate Fortnight, Annual
——, ——, Acute hematogenous osteomyelitis, Fenwick Beekman, 792
——, ——, Acute infections of the urinary tract, Joseph F. McCarthy, 808
——, ——, Cardiac neuroses, The, R. H. Halsey, 89
——, ——, Endocrines and the vegetative nervous system, Walter Timme, 33
——, ——, Focal infection as the cause of general disease, Frank Billings, 759
——, ——, General survey of visceral neuroses, Prof. L. Lichtwitz, 314
——, ——, Headache and migraine, Frederick Tilney, 69
——, ——, Immunity—general and local, The Wesley M. Carpenter Lecture, Hans Zinsser, 709
——, ——, Insomnia and disturbances of sleep, Carl Pototzky, 330
——, ——, Medical education and medical practice, C. F. Martin, 774
——, ——, Neurocirculatory asthenia, M. A. Rothschild, 223
——, ——, Neuroses following accident, Foster Kennedy, 1
——, ——, Postoperative emotional disorders; their prevention and management, R. B. McGraw, 179
——, ——, Psychoneuroses affecting the gastro-intestinal tract, The, B. B. Crohn, 155
——, ——, Psychoneuroses, The, Louis Casamajor, 287
——, ——, Psychotherapy, W. A. White, 287
——, ——, Surgical indications for sympathetic ganglionectomy and trunk resection in the treatment of diseases resulting from vasomotor spasm of peripheral arteries, The, A. W. Adson, 17
——, ——, Third, 353, 636, 688
Greek pediatrics, F. H. Garrison, 630
Grieves, Old remedies for old, Among our manuscripts, Miss G. L. Annan, 698

H

Haller, A new reading of, F. H. Garrison, 504
Haviland, Obituary of C. Floyd, 153
Headache and migraine, Frederick Tilney, 69
Heart in middle life, The nonvalvular diseases of the, David Riesman, 536
Hematogenous osteomyelitis, Acute, Fenwick Beekman, 792
Hirsch and Pagel, A reproduction of, F. H. Garrison, 189
History repeats itself, Archibald Malloch, 274
Hospital records, Legal status of, 49
Hunter, William and John, A study in contrasts, F. R. Packard, 664

I

Immunity—general and local, The Wesley M. Carpenter lecture, Hans Zinsser, 709
Incunabula, Progress in the cataloguing of medical (editorial), F. H. Garrison, 365
India, Medicine in, Sir W. J. Wanless, 105
Indian medicine, Newer sidelights on the antiquity and provenance of (editorial), F. H. Garrison, 523
Infection as the cause of general disease, Focal, Frank Billings, 759
Infections of the urinary tract, Acute, J. F. McCarthy, 808
Insomnia and disturbances of sleep, Carl Pototzky, 330

J

John of Arderne, F. S. Mathews, 461

L

Lectures, The Academy announces a fifth series of, 637
Legal status of hospital records, 49
Letters, The Conway, F. H. Garrison, 825
Library activities of benefit to the medical library world in general, Academy, Miss Janet Doe, 742
Library, Appointment of Mr. L. L. Mackall as consultant in bibliography, Archibald Malloch, 517
Library notes, Academy Library activities of benefit to the medical library world in general, Miss Janet Doe, 742
—— ——, Among our manuscripts, Miss G. L. Annan, 56, 698
—— ——, Appointment of Mr. L. L. Mackall as consultant in bibliography, Archibald Malloch, 517
—— ——, Collection of lantern slides, R. L. D., 275
—— ——, Dr. Manges's gifts to the Academy, First radium for treatment in this country, Archibald Malloch, 739
—— ——, Eighteenth century microscope given by Dr. Coleman, An, Archibald Malloch, 740
—— ——, History repeats itself, Archibald Malloch, 274
—— ——, Recent accessions, 51, 142, 210, 276, 354, 437, 518, 571, 642, 702, 745, 833
—— ——, Two gifts to the rare book room, L. F., 278
—— ——, Winthrop books in the Academy Library, Miss G. L. Annan, 695
Library, Recent accessions, 51, 142, 210, 276, 354, 437, 518, 571, 642, 702, 745, 833

M

Mackall as consultant in bibliography, Appointment of Mr. L. L., Archibald Malloch, 517

Management, Postoperative emotional disorders; their prevention and, R. B. McGraw, 179
Manges's gifts to the Academy, Dr., First radium for treatment in this country, Archibald Malloch, 739
Manson, In memory of, 279
Manuscripts, Among our, Miss G. L. Annan, 56
Manuscripts, Among our, Old remedies for old grieves, Miss G. L. Annan, 698
Massachusetts, Medicine in, F. H. Garrison, 734
Medal, Award of Academy, 142
Medical education and medical practice, C. F. Martin, 774
Medical Education, Committee on, 694
Medical Education, Recent publications of the Committee on, 354
Medical exchange opportunities, American German, 436
Medical incunabula, Progress in the cataloguing of (editorial), F. H. Garrison, 365
Medical library world in general, Academy Library activities of benefit to the, Miss Janet Doe, 742
Medical study, Opportunities which New York City offers for post-graduate, F. P. Reynolds, 265
Medical tour in Europe, A (editorial), F. H. Garrison, 243
Medicine in India, Sir W. J. Wanless, 105
Medicine in Massachusetts, F. H. Garrison, 734
Medicine, Newer sidelights on the antiquity and provenance of Indian (editorial), F. H. Garrison, 523
Medicine, Outline of preventive, 349
Medicine, Psychiatry's part in preventive, A. H. Ruggles, 453
Medicine, The eye in relation to general, E. S. Thomson, 577
Meetings, Proceedings of Academy, 59, 145, 213, 280, 357, 443, 749, 836
Memoriam, In, Walter M. Brickner, F. H. Garrison, 755
Microscope given by Dr. Coleman, An eighteenth century, Archibald Malloch, 740
Migraine, Headache and, Frederick Tilney, 69

N

Nervous system, Endocrines and the vegetative, Walter Timme, 33
Neuroses following accident, Foster Kennedy, 1
Neuroses, General survey of visceral, Prof. L. Lichtwitz, 314
Nomenclature of diseases, Suggestions for a national, H. B. Logie, 668
Nonvalvular diseases of the heart in middle life, The, David Riesman, 536

O

Obituary of C. Floyd Haviland, 153
Obituary of Charles Edwin Atwood, Frederick Peterson, 220
Obstetric practice be improved? Can our methods of, B. P. Watson, 647
Opportunities, American German medical exchange, 436
Opportunities which New York City offers for post-graduate medical study, F. P. Reynolds, 265
Osteomyelitis, Acute hematogenous, Fenwick Beekman, 792

P

Pagel, A reproduction of Hirsch and, F. H. Garrison, 189
Pediatrics, Greek, F. H. Garrison, 630
Post-graduate medical study, Opportunities which New York City offers for, F. P. Reynolds, 265
Postoperative emotional disorders: their prevention and management, R. B. McGraw, 179

Prevention and management, Postoperative emotional disorders; their, R. B. McGraw, 179
Preventive medicine, Outline of, 349
Preventive medicine, Psychiatry's part in, A. H. Ruggles, 453
Proceedings of Academy meetings, 59, 145, 213, 280, 357, 443, 749, 836
Progress in the cataloguing of medical incunabula (editorial), F. H. Garrison, 365
Provenance of Indian medicine, Newer sidelights on the antiquity and (editorial), F. H. Garrison, 523
Psychiatry's part in preventive medicine, A. H. Ruggles, 453
Psychoneuroses affecting the gastro-intestinal tract, The, B. B. Crohn, 155
Psychoneuroses, The, Louis Casamajor, 306
Psychotherapy, W. A. White, 287
Publications of the Committee on Medical Education, Recent, 354

R

Radium for treatment in this country, First, Dr. Manges's gifts to the Academy, Archibald Malloch, 739
Recent Accessions, 51, 142, 210, 276, 354, 437, 518, 571, 642, 702, 745, 833
Records, Legal status of hospital, 49
Remedies for old grieves, Old, Among our manuscripts, Miss G. L. Annan, 698
Report on the spas of Europe, E. H. L. Corwin, 553
Reproduction of Hirsch and Pagel, A., F. H. Garrison, 189
Resection in the treatment of diseases resulting from vasomotor spasm of peripheral arteries, The surgical indications for sympathetic ganglionectomy and trunk, A. W. Adson, 17
Resolution passed at meeting of Council May 28, 1930, 513
Resolution passed by the Council on the 22nd of January concerning the clause in the tariff relating to obscene books, 192
Rolleston's life of Allbutt, Sir Humphrey, F. H. Garrison, 132

S

Scholarship, Council accepts, 515
Scientific exhibit, 736
Section meetings,
Historical and Cultural Medicine:
John of Arderne, F. S. Mathews, 461
Medicine in India, Sir W. J. Wanless, 105—Discussion, E. H. Hume, 125, R. H. H. Goheen, 127, C. E. Vail, 130
William and John Hunter, A study in contrasts, F. R. Packard, 664
Sensitiveness as a cause of symptoms in disease, Specific, A. F. Coca, 593
Sleep, Insomnia and disturbances of, Carl Pototzky, 330
Slides, Collection of lantern, R. L. D., 275
Spas committee—summary of the report and recommendations, The, 193
Spas of Europe, Report on the, E. H. L. Corwin, 553
Spasm of peripheral arteries, The surgical indications for sympathetic ganglionectomy and trunk resection in the treatment of diseases resulting from vasomotor, A. W. Adson, 17
Status of hospital records, Legal, 49
Surgical indications for sympathetic ganglionectomy and trunk resection in the treatment of diseases resulting from vasomotor spasm of peripheral arteries, The, A. W. Adson, 17

Sympathetic ganglionectomy and trunk resection in the treatment of diseases resulting from vasomotor spasm of peripheral arteries, The surgical indications for, A. W. Adson, 17
Symptoms in disease, Specific sensitiveness as a cause of, A. F. Coca, 593

T

Tour in Europe, A medical (editorial), F. H. Garrison, 243
Training of specialists, On the, J. C. A. Gerster, E. H. Hume, J. F. McCarthy, Samuel McCullagh, Edgar Stillman, G. G. Ward, Carl Eggers, 509
Transfusion betterment association, Blood, 682

U

Urinary tract, Acute infections of the, J. F. McCarthy, 808

V

Vasomotor spasm of peripheral arteries, The surgical indications for sympathetic ganglionectomy and trunk resection in the treatment of diseases resulting from, A. W. Adson, 17
Vegetative nervous system, Endocrines and the, Walter Timme, 33
Visceral neuroses, General survey of, Prof. L. Lichtwitz, 314

W

Welch, Report of dinner given in honor of Dr. William H., 473
Winthrop books in the Academy Library, Miss G. L. Annan, 695

DATES OF ACADEMY MEETINGS

STATED MEETINGS

1st and 3rd Thursdays.

SECTION MEETINGS

Dermatology and Syphilology, 1st Tuesday.
Surgery, 1st Friday.
Neurology and Psychiatry, 2nd Tuesday.
Historical and Cultural Medicine, 2nd Wednesday of November, January, March and May.
Pediatrics, 2nd Thursday.
Otology, 2nd Friday.
Ophthalmology, 3rd Monday.
Medicine, 3rd Tuesday.
Genito-Urinary Surgery, 3rd Wednesday.
Orthopedic Surgery, 3rd Friday.
Obstetrics and Gynecology, 4th Tuesday.
Laryngology and Rhinology, 4th Wednesday.

TRUSTEES, COUNCIL AND COMMITTEE MEETINGS

Trustees, 4th Wednesday.
Council, 4th Wednesday.
Committee on Admission, 1st Wednesday.
Committee on Library, 2nd Tuesday.
Public Health Relations Committee, Mondays.
Committee on Medical Education, 2nd Thursday.

DONATIONS TO THE LIBRARY FUNDS

Donations and bequests are solicited by The New York Academy of Medicine for the maintenance and expansion of the Library.

A donation or bequest of $5,000 or more will provide for a special library fund, the income of which may be used for the general purposes of the Library or restricted to the purchase of books and periodicals, as the donor or testator may indicate.

FORM OF BEQUESTS

The following is a brief legal form as a suggestion under which bequests may be made in behalf of the Academy:

I give, devise and bequeath unto "The New York Academy of Medicine" of the City of New York, State of New York, a corporation duly incorporated by the Legislature of the State of New York by an act entitled, "An Act to Incorporate The New York Academy of Medicine," passed June 23, 1851, and amended June 4, 1853, June 2, 1877, and April 25, 1924, . . .

1930

STANDING COMMITTEES OF THE ACADEMY

Committee on Admission

Alexis V. Moschcowitz, *Chairman*

Fred P. Solley
Rolfe Floyd
Richard T. Atkins
Ward J. MacNeal
DeWitt Stetten
Harbeck Halsted
Henry W. Cave
Alfred T. Osgood
Harry M. Imboden
George M. MacKee

Emanuel D. Friedman

Committee on Library

Ernest G. Stillman, *Chairman*

Eugene F. DuBois
Alfred F. Hess
J. Ramsey Hunt
Alfred E. Cohn

Committee on Public Health Relations

James Alex. Miller, *Chairman*

Executive Committee

George Baehr
Charles L. Dana
Lewis F. Frissell
Charles Gordon Heyd
Adrian V. S. Lambert
Samuel W. Lambert
James B. Murphy
Bernard Sachs
Frederic E. Sondern
Philip Van Ingen
George B. Wallace
E. H. L. Corwin, *Executive Secretary*

Committee on Medical Education

Nellis B. Foster, *Chairman*

Executive Committee

Harlow Brooks
Arthur F. Chace
Carl Eggers
William W. Herrick
Edward H. Hume
Ludwig Kast
Samuel J. Kopetzky
Emanuel Libman
Joseph F. McCarthy
John J. Moorhead
B. S. Oppenheimer
George Gray Ward
Frederick P. Reynolds, *Medical Secretary*

Grace Carstensen, *Executive Secretary*

COMMITTEES OF THE COUNCIL AND TRUSTEES

House Committee

Arthur B. Duel, *Chairman*
Royal S. Haynes
Walter L. Niles
George David Stewart

Nominating Committee

George B. Wallace, *Chairman*
George Baehr
Haven Emerson

Committee on Professional Standards

Samuel W. Lambert, *Chairman*

Edwin Beer
A. Benson Cannon
Alfred T. Osgood
William B. Parsons, Jr.
Bernard Samuels
Arthur M. Wright

Finance Committee

Seth M. Milliken, *Chairman*
Samuel W. Lambert
James Alex. Miller
Eugene H. Pool

Advisory Finance Committee

Mr. George Blagden
Mr. Moreau Delano
Mr. James B. Mabon
Mr. Edwin G. Merrill

Press Relations Bureau

John J. Moorhead, *Chairman*

Ernest Fahnestock
Arnold Knapp
Samuel J. Kopetzky
Edgar Stillman
Orrin Sage Wightman

Iago Galdston, *Executive Secretary*

OFFICERS OF SECTIONS, 1930-1931

DERMATOLOGY AND SYPHILOLOGY, 1st Tuesday

Chairman	*Secretary*
WALTER J. HIGHMAN	A. BENSON CANNON
853 Seventh Avenue	371 Park Avenue

SURGERY, 1st Friday

OTTO CARL PICKHARDT	ROBERT H. KENNEDY
117 East 80th Street	115 East 61st Street

NEUROLOGY AND PSYCHIATRY, 2nd Tuesday

MICHAEL OSNATO	JOSEPH H. GLOBUS
121 East 60th Street	1185 Park Avenue

HISTORICAL AND CULTURAL MEDICINE

2nd Wednesday of November, January, March and May

FREDERICK PETERSON	HOWARD REID CRAIG
20 West 50th Street	125 East 74th Street

PEDIATRICS, 2nd Thursday

HUGH CHAPLIN	JOHN CAFFEY
108 East 68th Street	Babies' Hosp., 167th St. & Bway.

OTOLOGY, 2nd Friday

HUGH B. BLACKWELL	RENE HECTOR HUVELLE
2 East 54th Street	17 East 38th Street

OPHTHALMOLOGY, 3rd Monday

ERNEST F. KRUG	WILLIAM F. C. STEINBUGLER
988 Fifth Avenue	815 Park Avenue

MEDICINE, 3rd Tuesday

ARTHUR H. TERRY, JR.	HAROLD E. B. PARDEE
161 East 64th Street	160 East 64th Street

GENITO-URINARY SURGERY, 3rd Wednesday

THOMAS J. KIRWIN	MEREDITH F. CAMPBELL
730 Park Avenue	33 East 68th Street

ORTHOPEDIC SURGERY, 3rd Friday

ALAN DEF. SMITH	ISADORE ZADEK
410 East 57th Street	1095 Park Avenue

OBSTETRICS AND GYNECOLOGY, 4th Tuesday

DAVID N. BARROWS	GERARD L. MOENCH
130 East 56th Street	30 East 58th Street

LARYNGOLOGY AND RHINOLOGY, 4th Wednesday

JOHN M. LORÉ	ROBERT E. BUCKLEY
325 West End Avenue	829 Park Avenue